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Administrative Bulletins of the University of California

1917–18. No. 1

ORGANIZATION OF THE UNIVERSITY

The University of California is an integral part of the public educational system of the State. As such it completes the work begun in the public schools. Through aid from the State and the United States, and by private gifts, it furnishes instruction in literature and in science, and in the professions of engineering, art, law, medicine, dentistry, and pharmacy. In the Colleges of Letters and Science, Commerce, Agriculture, Mechanics, Mining, Civil Engineering, and Chemistry these privileges are offered without charge for tuition to all residents of California who are qualified for admission. Non-residents of California are charged a tuition fee of $10 each half-year. In the professional colleges, except that of Law, tuition fees are charged. The instruction in all the colleges is open to all qualified persons, without distinction of sex. The Constitution of the State provides for the perpetuation of the University, with all its departments.

CIRCULARS OF INFORMATION

Letters of inquiry concerning the College of Agriculture should be addressed to the *Dean of the College of Agriculture, Berkeley, California.*

For the following circulars of information concerning the several colleges and departments of the University apply to the *Recorder of the Faculties, University of California, Berkeley, California.*

The Circular of Information, Academic Departments (Colleges of Letters and Science, Agriculture, Commerce, and Engineering, and the first two years of Medicine). Containing general information about the University, its organization, government, faculties, requirements for admission both to graduate and undergraduate status, requirements for degrees and teachers' recommendations, expenses. Detailed information is given in the other publications mentioned in this list.

The Annual Announcement of the Graduate Division.

The Annual Commencement Programme. Containing the list of degrees conferred, scholarships, prizes, and other honors.

Specimen extrance examination papers.

The Annual Announcement of Courses of Instruction in the Academic Departments. Price, 10 cents. Sent by mail by the Recorder of the Faculties for 15 cents.

(Continued on third page of cover)

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UNIVERSITY OF CALIFORNIA

ANNOUNCEMENT

OF

COURSES OF INSTRUCTION

IN THE COLLEGES OF LETTERS AND SCIENCE,
COMMERCE, AGRICULTURE, MECHANICS,
MINING, CIVIL ENGINEERING, AND CHEMISTRY

THE SCHOOLS OF
ARCHITECTURE, EDUCATION, AND JURISPRUDENCE

AND THE FIRST AND SECOND YEARS OF
THE MEDICAL SCHOOL

FOR THE ACADEMIC YEAR 1917-18

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY
1917

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CLASSIFICATION AND NUMBERING OF COURSES

CLASSIFICATION.

I. UNDERGRADUATE COURSES.

1. *Lower Division Courses.*

(*a*) A prescribed course is one that is required specifically or as an alternative for graduation in any particular college.

(*b*) A free-elective course in the lower division is any course that is not prescribed. A free-elective course may be taken as a prerequisite for a more advanced elective in the same field.

2. *Upper Division Courses.*

(*a*) A major course is an upper division course of advanced work in a department of study that has been pursued in the lower division, or of elementary work in a subject of such difficulty as to require the maturity of upper division students. All major courses are definitely announced as such, and are given the numbers 100-199, as is explained below. Concerning *honors*, see the annual Circular of Information of the Academic Departments in addition to the departmental announcements in the following pages.

(*b*) A free-elective course in the upper division is a course for which the Junior Certificate or junior standing is normally prerequisite, but which does not demand necessarily any preliminary knowledge of the subject. Lower division courses may be taken as free-electives in the upper division, but upper division courses, whether free-elective or otherwise, are not open to students of the lower division without the special permission of the department concerned.

II. GRADUATE COURSES.

NUMBERING.

Excepting only the major courses, *all undergraduate courses*, whether in the lower or upper division, are numbered from 1 to 99, inclusive.

Undergraduate major courses are numbered from 100 to 199, inclusive.

Graduate courses are numbered from 200 to 299, inclusive.

Year Courses; Double Numbers. A course designated by a double number (for example, History 1A–1B) is continued through two successive half-years, that is, from August to May, or from January to December. The student will use the first number in registering for the course during its first half-year, and the second number during its second half-year. A *final* report will be made by the instructor at the end of each half-year; "provisional mid-year reports" in year courses have been discontinued. The student may discontinue the course at the end of the first half-year, with final credit for the first half of the course.

CREDIT VALUATION OF COURSES

In the ANNOUNCEMENT OF COURSES the credit value per half-year for every course is indicated. It is to be understood that the number of units agrees with the number of "hours" except where otherwise stated.

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THE UNIVERSITY LIBRARY

The University Library building, provided by the bequest of the late Charles F. Doe, was first occupied in June, 1911, at the opening of the Summer Session. The library at present contains over 340,000 volumes. A collection of between 15,000 and 20,000 volumes is being gradually accumulated on open sheleves in the large reading room, free of access to all students; and, in addition, the seminar rooms, in which special collections on various subjects are installed, provide accommodations for more advanced workers.

Among the more important special collections may be mentioned the Bancroft Library of west American history, which is unique in its field, and the Weinhold collection on Germanic philology and folklore. The law library of something over 12,000 volumes is separately housed in the Boalt Hall of Law.

The current serials and periodicals, amounting to considerably over 7,000 titles, are kept in a special room of the University Library. Much unusual material, especially in the field of foreign scientific publications, is received in exchange for the publications of the University and is included here.

The resources of the library are supplemented by an inter-library loan system, and information as to the resources of certain other large libraries, which can be drawn upon when necessary, is provided by the depository catalogue. This contains the printed cards of the Library of Congress, the University and John Crerar libraries in Chicago, and the Harvard University Library, as well as cards on special subjects published by the Royal Library in Berlin.

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COURSES OF INSTRUCTION OFFERED IN THE COLLEGES AT BERKELEY FOR THE ACADEMIC YEAR, 1917-18

AGRICULTURE

THOMAS F. HUNT, D.Agr., Sc.D., Professor of Agriculture, Dean of the College of Agriculture and Director of the Agricultural Experiment Station.

ROBERT H. LOUGHRIDGE, Ph.D., Professor of Agricultural Chemistry, Emeritus.

EDWARD J. WICKSON, M.A., Professor of Horticulture, Emeritus.

HUBERT E. VAN NORMAN, B.S., Professor of Dairy Management, Vice-Director of Agricultural Experiment Station, and Dean of University Farm School.

HERBERT J. WEBBER, Ph.D., Professor of Plant Breeding, Director of the Citrus Experiment Station, and Dean of the Graduate School of Tropical Agriculture.

MYER E. JAFFA, M.S., Professor of Nutrition.

CHARLES W. WOODWORTH, M.S., Professor of Entomology.

RALPH E. SMITH, B.S., Professor of Plant Pathology.

J. ELIOT COIT, Ph.D., Professor of Citriculture.

CHARLES F. SHAW, B.S., Professor of Soil Technology.

JOHN W. GREGG, B.S., Professor of Landscape Gardening and Floriculture.

JOHN W. GILMORE, M.S., Professor of Agronomy.

FREDERIC T. BIOLETTI, M.S., Professor of Viticulture and Enology.

WARREN T. CLARKE, B.S., Professor of Agricultural Extension and Superintendent of Farmers' Institutes.

JOHN S. BURD, B.S., Professor of Agricultural Chemistry.

CHARLES B. LIPMAN, Ph.D., Professor of Soil Chemistry and Bacteriology.

CLARENCE M. HARING, D.V.M., Professor of Veterinary Science.

ERNEST B. BABCOCK, M.S., Professor of Genetics.

GORDON H. TRUE, B.S., Profesor of Animal Husbandry, Davis.

JAMES T. BARRETT, Ph.D., Professor of Plant Pathology in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

FRITZ W. WOLL, Ph.D., Professor of Animal Nutrition, Davis.

WALTER MULFORD, F.E., Professor of Forestry.

WALTER P. KELLEY, Ph.D., Professor of Agricultural Chemistry in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

DAVID T. MASON, M.F., Professor of Forestry.

HENRY J. QUAYLE, M.S., Professor of Entomology in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

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ELWOOD MEAD, D.Eng., Professor of Rural Institutions.

HOWARD S. REED, Ph.D., Professor of Plant Physiology in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

JAY B. DAVIDSON, A.E., Professor of Agricultural Engineering, Davis.

FRANK ADAMS, M.S., Professor of Irrigation Investigations.

CHESTER L. ROADHOUSE, D.V.M., Professor of Dairy Industry, Davis.

LEON D. BATCHELOR, Ph.D., Professor of Plant Breeding in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

*HOWARD S. FAWCETT, M.S., Associate Professor of Plant Pathology in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

WILLIAM T. HORNE, B.S., Associate Professor of Plant Pathology.

ERWIN J. LEA, M.S., Associate Professor of Nutrition.

WALTER L. HOWARD, Ph.D., Associated Professor of Pomology, Davis.

WILLIAM B. HERMS, M.A., Associate Professor of Parasitology.

WILLIAM G. HUMMEL, M.S., Associate Professor of Agricultural Education.

JOHN E. DOUGHERTY, B.S., Associate Professor of Poultry Husbandry, Davis.

BERTRAM H. CROCHERON, M.S.A., Associate Professor of Agricultural Extension.

GEORGE H. HART, M.D., D.V.M., Associate Professor of Veterinary Science.

DAVID N. MORGAN, B.S., Associate Professor of Agriculture and Assistant to the Director.

PATRICK B. KENNEDY, Ph.D., Associate Professor of Agronomy.

RICHARD L. ADAMS, M.S., Associate Professor of Agronomy.

STANLEY S. ROGERS, B.S., Associate Professor of Olericulture, Davis.

JOHN I. THOMPSON, B.S.A., Assistant Professor of Animal Husbandry, Davis.

BEN A. MADSON, B.S.A., Assistant Professor of Agronomy, Davis.

WALTER E. PACKARD, M.S., Assistant Professor of Agronomy and Experimental Agronomist in charge of Imperial Valley Station, El Centro.

FRED M. HAYES, D.V.M., Assistant Professor of Veterinary Science, Davis.

WILLIAM V. CRUESS, B.S., Assistant Professor of Zymology.

SAMUEL H. BECKETT, B.S., Assistant Professor of Irrigation Practice, Davis.

JAMES W. NELSON, B.S., Assistant Professor of Soil Technology.

LESLIE T. SHARP, B.S., Assistant Professor of Soil Chemistry and Bacteriology.

DENNIS R. HOAGLAND, M.A., Assistant Professor of Agricultural Chemistry.

GUY R. STEWART, B.S., Assistant Professor of Agricultural Chemistry.

O. J. KERN, Assistant Professor of Agricultural Education.

RALPH T. STEVENS, B.S., Assistant Professor of Landscape Gardening and Floriculture.

* Absent on leave, 1917–18.

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MERRITT B. PRATT, M.F., Assistant Professor of Forestry.

ROLAND S. VAILE, A.B., Assistant Professor of Orchard Management in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

ROBERT F. MILLER, M.S., Assistant Professor of Animal Husbandry, Davis.

JACOB TRAUM, D.V.M., Assistant Professor of Veterinary Science.

WOODBRIDGE METCALF, M.S., Assistant Professor of Forestry.

T. FRANCIS HUNT, B.S., Assistant Professor of Agricultural Extension and Assistant Superintendent of Farmers' Institutes.

ELIZABETH H. SMITH, M.S., Assistant Professor of Plant Pathology.

RALPH H. TAYLOR, B.S., Assistant Professor of Pomology.

*EDWIN C. VAN DYKE, M.D., Assistant Professor of Entomology (Exchange Professor at Cornell University, 1917–18).

IRA J. CONDIT, B.S., Assistant Professor of Citriculture.

DONALD BRUCE, M.F., Assistant Professor of Forestry.

HENRY A. MATTILL, Ph.D., Assistant Professor of Nutrition.

WILLIAM F. GERICKE, M.S., Assistant Professor of Soil Chemistry.

ALFRED SMITH, M.A., Assistant Professor of Soil Technology.

ROY E. CLAUSEN, Ph.D., Assistant Professor of Genetics.

EDWARD O. ESSIG, M.S., Assistant Professor of Entomology.

VIRGIL C. BRYANT, M.S., Assistant Professor of Agricultural Extension.

CHESTER W. RUBEL, B.S.A., Assistant Professor of Agricultural Extension.

WILLIAM B. PARKER, M.S., Assistant Professor of Agricultural Extension, Riverside.

GEORGE P. GRAY, M.S., Assistant Professor of Entomology and Chemist in Insecticide Laboratory.

HARRY S. BAIRD, B.S., Assistant Professor of Dairy Industry, Davis.

GEORGE W. HENDRY, B.S., Assistant Professor of Agronomy.

ARTHUR H. HENDRICKSON, B.S. Assistant Professor of Pomology.

WARREN P. TUFTS, M.S., Assistant Professor of Pomology, Davis.

PAUL L. HIBBARD, B.S., Assistant Professor of Agricultural Chemistry.

WILLIAM H. HEILEMAN, M.S., Assistant Professor of Agricultural Extension.

JAMES C. BRADLEY, Ph.D., Assistant Professor of Entomology (Exchange Professor from Cornell University, 1917-1918).

HOWARD B. FROST, Ph.D., Instructor in Plant Breeding in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.

FRIEDRICH C. H. FLOSSFEDER, Instructor in Viticulture and Superintendent of Grounds, Davis.

GEORGE A. COLEMAN, M.A., Instructor in Entomology and Curator of the Agricultural Museum.

HUBERT L. BELTON, Instructor in Shopwork, Davis.

ROSS C. INGRIM, Instructor in Shopwork, Davis.

CLAYTON O. SMITH, M.A., Instructor in Plant Pathology, Whittier.

DANIEL H. CAREY, B.S., Instructor in Floriculture and Superintendent of Greenhouses and Gardens.

STANLEY B. FREEBORN, B.S., Instructor in Entomology.

*Absent on leave, 1917-18.

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EDWIN C. VOORHIES, B.S., Assistant Professor of Animal Husbandry, Davis.
WYLIE E. LLOYD, B.S., Instructor in Poultry Husbandry, Davis.
LEONARD J. FLETCHER, B.S., Instructor in Agricultural Engineering, Davis.
OWEN F. BURGER, Sc.D., Instructor in Plant Pathology in the Citrus Experiment Station and Graduate School of Tropical Agriculture, Riverside.
STEPHEN L. DENNING, B.S., Instructor in Dairy Industry, Davis.
RALPH P. ROYCE, B.S., Instructor in Animal Husbandry, Davis.
HENRY H. P. SEVERIN, Ph.D., Instructor in Entomology.
WALTER C. DEAN, B.S., Instructor in Soil Technology.
ELMER R. DEONG, B.S., Instructor in Entomology, Davis.
WILLIAM L. SWEET, M.S., Instructor in Pomology.
J. RAYMOND BEACH, D.V.M., Instructor in Veterinary Science, Davis.
PETER T. PETERSON, D.V.M., Instructor in Veterinary Science, in charge of serum manufacture.
ROBERT W. HODGSON, B.S., Instructor in Citriculture.
HARRY M. BUTTERFIELD, B.S., Instructor in Agricultural Education.
MEREDITH R. MILLER, B.S., Assistant Chemist in Insecticide Control.
ARTHUR W. CHRISTIE, M.S., Instructor in Agricultural Chemistry.
KATHERINE JONES, B.S., Assistant in Landscape Gardening and Floriculture.
FRANCIS W. ALBRO, B.S., Assistant in Nutrition.
DONALD E. MARTIN, B.S., Assistant in Soil Chemistry and Bacteriology.
JAMES R. ZION, B.S., Assistant in Viticulture.
EARL B. BISBEE, B.S., Instructor in Dairy Industry, Davis.
WALTER C. ROBERTS, B.S., Assistant in Soil Chemistry.
HAROLD A. WADSWORTH, B.S., Assistant in Irrigation Investigations.
J. C. MARTIN, B.S., Assistant in Agricultural Chemistry.
G. F. FERMERY, Assistant in Agricultural Engineering, Davis.
WALTER W. WOBUS, B.S., Assistant in Agricultural Education.

Upper Division Courses.—All upper division courses announced by this department presuppose at least junior standing in the College of Agriculture. Students in other colleges may elect such courses in the department of agriculture as they are qualified to pursue.

Honors.—Students who become candidates for the bachelor's degree may be recommended for honors on the basis of the quality of the work done in the regular curriculum of the senior year or its equivalent, or on the basis of a thesis showing ability to do original work.

Practice Courses.—Every student is required to complete a practice course in the subject which he elects for his major study. The object of these courses is to give the student an insight into the actual practice of his chosen occupation. The practice courses consist of two general lines of work: (1) technical, instructional courses carrying 6 units credit, and (2) practical work on a farm, in a laboratory, factory, or other commercial enterprise, carrying no university credit. Students who take the latter work (2) are required to offer, in addition, 6 units chosen from any university department in order to make up the 130 units required for graduation.

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AGRICULTURAL CHEMISTRY

1. General Agricultural Chemistry. Professor BURD.

The relation of chemistry to agriculture. Lectures.

3 hrs., first half-year. Tu Th S, 9. Prerequisite: Chemistry 1A–1B. Prescribed for sophomores in the College of Agriculture.

2. Agricultural Laboratory.
Professor BURD, Mr. CHRISTIE, and Mr. MARTIN.

Experiments with and laboratory tests of agricultural materials.

6 hrs., first half-year; 2 units. Sec. I, M F, 1–4; Sec. II, Tu Th, 1–4. Prerequisite: Chemistry 1A–1B. Prescribed concurrently with course 1 for sophomores in the College of Agriculture.

101A–101B. Advanced Agricultural Chemistry.
Assistant Professor HOAGLAND.

The technical application of chemical principles to agricultural phenomena and problems; complete and proximate analysis of materials of agricultural interest; choice of methods, limits of permissable error, interpretation of results obtained in the laboratory.

7 hrs., throughout the year; 3 units each half-year. Lecture to be arranged; laboratory, first half-year, Tu Th, 1–4; second half-year, Tu Th, 2–5. Prerequisite: Chemistry 5 or 6A–6B and 8A–8B (6A–6B recommended; 8A–8B may be taken concurrently). Required for the major in agricultural chemistry.

102. The Chemistry of Fertilizers. Assistant Professor HIBBARD.

The relations of fertilizers to plants and soils; chemical examination with special reference to agricultural and commercial evaluation; the correlation of chemical properties and physical texture with availability.

6 hrs., second half-year; 2 units. Lectures and discussions as required. Laboratory, Tu Th, 9–12. Prerequisite: courses 1 and 2; Chemistry 5 or 6A–6B. Required for the major in agricultural chemistry and soils.

103. Laboratory Study of Selected Topics.
Assistant Professor HOAGLAND.

Continuation of course 101A–101B. Prerequisite to thesis course.

6 hrs. laboratory, 1 hr. lecture and discussion, first half-year; 3 units. Prerequisite: course 101A–101B. Required for the major in agricultural chemistry.

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104A–104B. Pro-seminar.
Professor BURD and Assistant Professor HOAGLAND.

Discussion of literature and papers prepared by members of the class.

2 hrs. bi-weekly, throughout the year; 1 unit each half-year. Alternate Th, 4–6. Required in the junior and senior years for the major in agricultural chemistry. Elective to those taking course 101A–101B.

103. Thesis Course. Instructor in charge of Thesis.

4 units. Hours to be arranged. Prerequisite: course 103.

201. Research. Professor BURD.

Hours to be arranged.

AGRICULTURAL EDUCATION

5. Agencies for Rural Progress. Assistant Professor KERN.

Country life problems, agencies for rural progress, and the best means of utilizing those agencies for the improvement of rural communities. Lectures, assigned readings, and reports.

3 hrs., second half-year. M Tu W, 9.

99. Practice Course.

Arrangements may be made by consultation with the head of the division.

100. Elements of Agriculture, Nature Study and School Gardens.
Assistant Professor KERN.

Aims, methods and materials used in agricultural instruction in the elementary and grade schools; teaching plans; educational value of the school garden; the home garden and the value of home project work in agricultural education. Practical garden work on the campus.

5 hrs., either half-year; 3 units. Lectures, M W, 1; laboratory, Tu, 1–4.

101. High School Farms, Gardens, and Community Work.
Associate Professor HUMMEL.

Lectures, reports, and conferences on the utilization of land in connection with agricultural teaching; means by which the facilities of a school can be brought into intimate and helpful relation with the agricultural interests and home life of the community supporting the school; practice in planning and executing school farm problems and demonstrations.

5 hrs., second half-year; 3 units. Lectures, M W, 11; laboratory, F, 1–4. Prerequisite: senior standing.

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102. General Science and First-year Agriculture.
Associate Professor HUMMEL.

The aims and values of a general science course in the high school, comparative study of typical courses, and exposition of the peculiar adaptations to the general science work of an elementary agricultural course in which plant study forms the basis of continuity. The equipment, nature, and amount of practical work needed in the course, including field trips and excursions, outdoor and laboratory exercises, will be considered in detail.

3 hrs., first half-year. M W F, 2.

104. Agriculture in Secondary Schools. Associate Professor HUMMEL.

Agricultural teaching, including its history, the teaching methods to be employed and the equipment needed. A general consideration of the educational aims and values of the work and of the organization of the course is followed by a detailed study of materials and methods involved in the teaching of elementary agriculture, dairying, animal husbandry, horticulture, etc. Lectures, readings, and assigned practicums.

3 hrs., first half-year. M W F, 10. Prerequisite: senior standing.

105. Rural School Administration. Assistant Professor KERN.

Readings and classroom discussions of the fundamentals of rural school organization, management, and improvement.

3 hrs., first half-year. M Tu W, 9.

115. Individual Study of Selected Topics in Agricultural Education.
Associate Professor HUMMEL and Assistant Professor KERN.

Either half-year. Hours to be arranged.

120A–120B. Pro-seminar.
Associate Professor HUMMEL and Assistant Professor KERN.

2 hrs., throughout the year. Tu, 3–5.

125. The Practice of Teaching Agriculture.
Associate Professor HUMMEL.

A five weeks' practice course in selected high schools of the state. Making of lesson plans, practice teaching, reports and conferences with supervising teacher and instructor. Supervised practice teaching and observation of methods and management of class and laboratory instruction by the local teacher. By arrangement with the Department of Education, properly prepared students may satisfy the requirements in practice teaching for the high school teacher's recommendation by taking this course instead of Education 201.

To begin immediately after the close of the second half-year; 4 units. Prerequisite: courses 102 and 104 and Education 223.

202. Special Studies in Agricultural Education.
Associate Professor HUMMEL and Assistant Professor KERN.

Either half-year. Hours to be arranged.

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AGRONOMY

99. Practice course.
Associate Professor ADAMS and Assistant Professor HENDRY.

Methods of crop production and farm management, with practice work. Trips into the surrounding country.

Six weeks. Daily, except Sunday, beginning the day after Commencement; 6 units.

(Given at Berkeley)

103. Seeds. Associate Professor KENNEDY.

Morphology and relationship of seeds, impurities, germination. Special attention will be given to seeds of economic importance.

4 hrs., second half-year; 2 units. Lecture, Th, 1; laboratory, Th, 2–5.

*104. Weeds. Associate Professor KENNEDY.

The appearance, habits, and problems of the more common weeds in their relation to agriculture. Lectures and demonstrations.

2 hrs., second half-year.

106. Cereals. Assistant Professor HENDRY.

The cereals of America with special reference to California and Pacific Coast conditions. It is highly desirable that the student should have finished Botany 3 before entering upon the course.

5 hrs., first half-year; 3 units. Lectures, Tu Th, 9; laboratory, Th, 2–5.

108. Agrostology. Associate Professor KENNEDY.

Morphology and taxonomy of grasses and legumes in their relations to agriculture.

5 hrs., second half-year; 3 units. Lectures, Tu Th, 9; laboratory, Tu, 2–5. Prerequisite: Botany 2, 3, and 104B.

118. Farm Management. Associate Professor ADAMS.

The business aspects of land management. The relation of capital, choice of land, farm equipment, farm layout, cropping systems, labor, marketing and farm accounts to specific agricultural industries, both special and general. The correlation and application of agricultural principles to specific problems. Open only to seniors.

3 hrs., first half-year. M W F, 9.

119. Farm Management. Associate Professor ADAMS.

Advanced and special problems supplementing course 118. Open only to seniors.

2 hrs, first half-year. M, 2–4.

* Not to be given, 1917–18.

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120. Crop Production. **Professor GILMORE.**

Field practice and experimental methods of crop production, crop management, maintenance of fertility, and miscellaneous crops. Lectures, assigned readings, and problems.

3 hrs., second half-year. Tu Th S, 10. Prerequisite: Soil Technology 1.

130. Conference—Special Topics. **Professor GILMORE and STAFF.**

Presentation of reports and papers with discussions on subjects assigned.

2 hrs., first half-year; 1 unit. W, 4–6.

131A–131B. Thesis. **Professor GILMORE and STAFF.**

Study of literature with laboratory or field investigations on problems assigned.

Throughout the year; 1 to 2 units each half-year.

200. Advanced Agronomy. **Professor GILMORE.**

Original investigation of problems in crop production.

Either half-year. Hours to be arranged.

201. Advanced Agrostology. **Associate Professor KENNEDY.**

Original investigation of forage crops and problems.

Either half-year. Hours to be arranged.

202. Advanced Farm Management. **Associate Professor ADAMS.**

Original investigation of problems in farm management.

Either half-year. Hours to be arranged.

(Given at Davis)

100. Advanced Practice. **Assistant Professor MADSON.**

Practice and correlated problems in crop production as conducted in the field with experimental plots.

9 hrs., second half-year; 3 units.

107. Forage Crops. **Associate Professor KENNEDY.**

The plants which produce feed for live-stock: their characteristics, adaptations and culture methods; the principles underlying the maintenance of meadows, pastures and ranges. Lectures and demonstrations.

5 hrs., second half-year; 3 units. M, 11; Tu, 9; M, 1–4.

111. Field Practice. **Assistant Professors MADSON and HENDRY.**

Field studies with work on tabulation and correlation of operations and results. Various types and varieties of field crops and the cultural methods involved in their production.

9 hrs., second half-year; 3 units. W F, 1–5:30.

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ANIMAL HUSBANDRY

99. Practice in Animal Husbandry. Professor TRUE and STAFF.

Summer practice course at the University Farm for students with a major in animal husbandry. Work is adapted to the needs of the individual student.

6 weeks beginning the day after Commencement. 6 units.

(Given at Berkeley)

100. Farm Animals. Professor TRUE.

A general course on the breeds, care, and management of farm animals, designed especially for students who have not a major in animal husbandry.

3 hrs., first half-year. M Tu W, 4.

(Given at Davis)

101. Management of Farm Animals. Assistant Professor MILLER.

The care and management of horses, beef cattle, dairy cattle, sheep and hogs; lectures and practice work in the feeding and care of animals at the barn and fitting stock for exhibition purposes.

2 lectures and 2 laboratory periods; 4 units. One laboratory period will include stable practice with the different classes of live stock at the University Farm.

102. Feeding of Farm Animals. Assistant Professor MILLER.

A study of the common feed stuffs and their uses with respect to horses, beef cattle, dairy cattle, sheep and hogs.

4 hrs., second half-year.

105. Dairy Cattle and Hogs.
Professor TRUE and Assistant Professor THOMPSON.

Lectures on the origin, history and development of breeds; practice work in judging.

6 hrs., second half-year; 4 units. Lectures, M Th, 8; laboratory, M Th, 9–11.

106. Beef Cattle, Horses and Sheep.
Assistant Professors THOMPSON and MILLER.

A continuation of course 105.

6 hrs., second half-year; 4 units. Lectures, M Th, 8; laboratory, M Th, 9–11.

107. Breeding Farm Animals. Assistant Professor THOMPSON.

The application of the principles of heredity, atavism, reversion, inbreeding, line breeding, etc., to the practice of breeding farm animals. Lectures, recitations, discussions.

3 hrs., second half-year. Tu W Th, 9.

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108. Milk Production. Assistant Professor VOORHIES.

Lectures and recitations on the types of dairies, advanced registry systems, dairy laws and inspection, calf raising, plans for dairy buildings; discussion of the milch goat industry.

3 hrs., second half-year. Tu Th F, 11.

109. Pro-seminar. Professor TRUE.

Bi-weekly topics and discussions of special problems in animal breeding and management.

2 hrs., second half-year; 1 unit.

110. Pro-seminar. Professor WOLL.

Bi-weekly topics and discussions of special problems in animal feeding.

2 hrs., second half-year; 1 unit.

CITRICULTURE

99. Practice Course. Professor COIT and Assistant Professor CONDIT.

A traveling practice course in citrus and other semi-tropical fruits, designed to bring the student into active contact with the great fruit industries of the state and to give him some actual practice in as many of the operations of fruit production as practicable.

Six weeks. Daily, except Sunday, beginning about the middle of May; 6 units. This course or its equivalent is required for graduation of those specializing in citriculture. Prerequisite: two years' study in a university or college course.

101. Citrus Fruits. Professor COIT.

Propagation, location and management of orchards, orchard heating, harvesting, packing, storing, marketing, and pest control. Lectures, assigned readings, and reports.

4 hrs., second half-year. Tu Th S, 8; Th, 4.

102. Semi-Tropical Fruits. Assistant Professor CONDIT.

Semi-tropical fruits grown in California, including the olive, date, fig, avocado, guava, loquat, mango, feijoa, and others. Classification, morphology, propagation, culture, harvesting, packing, etc. Lectures, assigned readings, and laboratory work.

6 hrs., first half-year; 4 units. Lectures, Tu Th S, 11; laboratory, Sec. I, M, 9–12; II, Tu, 2–5.

103. Pro-seminar. Professor COIT.

Assigned special topics requiring extended research into pomological literature. Reports and discussions. Required of and limited to regular and graduate students electing citriculture as their major subject.

2 hrs., either half-year. M, 3–5.

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104. Citrus Investigations. Professor COIT.

3 or 6 hrs., either half-year; 1 or 2 units. Hours to be arranged. Prerequisite: senior standing in the College of Agriculture.

105. Advanced Citrus Fruits.
Professor COIT and Assistant Professor CONDIT.

Classification, morphology and chemistry of citrus fruits. History and status of citrus industry in United States and foreign countries. Lectures, written reports, and laboratory work.

5 hrs., second half-year; 3 units. Lectures, Tu Th, 11; laboratory, Tu, 2–5. Prerequisite: course 101, completed or in progress.

106. Physiology and Anatomy of Citrus and Semi-tropical Fruit Plants.
Mr. HODGSON.

The practical application of the principles of plant physiology and anatomy to the common problems of fruit production, transportation, and storage.

7 hrs., second half-year; 3 units. Lectures, M, 2; laboratory, W F, 2–5. Prerequisite: Chemistry 1A–1B; Botany 2 and 3.

201A–201B. Laboratory or Field Research. Professor COIT.

Topics for research in citrus or semi-tropical fruits. Open to graduate students desiring to write theses.

Throughout the year; hours to be arranged. Prerequisite; courses 101, 102, 103, and 105, or equivalent training. For further particulars, see Announcement of the Graduate Division.

DAIRY INDUSTRY

(Given at Davis)

99. Practice in Dairying.

Dairy manufactures, market milk, dairy production. May be taken at the University Farm in the creamery, or at the dairy barns, or in any other creamery, milk plant or dairy farm approved by the division. May be taken after either the sophomore or junior years. Six weeks, beginning the day after Commencement.

6 units. (Credit given only when taken at the University Farm).

102. Cheese Making. Assistant Professor BAIRD.

Instruction and practice in the manufacture of different varieties of hard and soft cheese. Paraffine, curing and marketing.

6 hrs., second half-year; 3 units. M Th, 10; Tu, 1–5.

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116. Testing Dairy Products. Mr. BISBEE.

The nature and composition of milk and the practical application of methods of testing dairy products. Students who have credit for course 132 will not be given credit for this course.

4 hrs., second half-year; 2 units. W, 1–5.

127. Milk and Milk Products. Assistant Professor BAIRD.

The properties, care and handling of milk; principles and application of the Babcock tests; the construction and operation of different makes of separators; practice in the handling and churning of cream; farm cheese making. Students who have credit for course 132 will receive but 2 units credit.

5 hrs., second half-year; 3 units. Tu, 9; W, 8; Tu, 1–4.

128. Butter and Ice Cream Making.
Assistant Professor BAIRD and Mr. DENNING.

The principles of creamery butter making; pasteurization, ripening and churning of cream; handling and marketing butter. Instruction and practice in the manufacture of plain and fancy ice creams, ices and sherbets.

5 hrs., second half-year; 3 units. M, 1; Tu, 9; F, 1–4.

130. Market Milk. Professor ROADHOUSE and Mr. BISBEE.

Conditions affecting quality of milk for direct consumption; requisites for producing different grades of milk; tests for quality, adulteration, etc.; pasteurizing, standardizing, and bottling milk for distribution; inspecting dairies and milk plants.

5 hrs., second half-year; 3 units. W F, 10; Th, 1–4. Prerequisite: course 127 or 132; course 127 may be taken concurrently.

(Given at Berkeley)

132. Dairy Fundamentals. Assistant Professor BAIRD.

The secretion, nature, and composition of milk and milk products; various tests used in testing dairy products; regulations covering the care and handling of milk and cream; dairy inspection; a survey of the dairy industry and a study of California dairy conditions. Students who have credit for course 116 will receive but 1 unit credit.

5 hrs., first half-year; 3 units. Lectures, F, 1; S, 8; laboratory, F, 2–5.

A major subject in dairy industry may include the following courses: Animal Husbandry 105, Dairy Cattle and Hogs; Animal Husbandry 108, Milk Production; Nutrition 109, Dairy Chemistry; Veterinary Science 111: Veterinary Science 117, Bacteriology of Milk and Sanitary Milk Production; Farm Mechanics 102, Dairy Mechanics.

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ENTOMOLOGY

1. General Entomology.
Professor WOODWORTH and Assistant Professor BRADLEY.

A general review of the structure, habits, and classification of insects.

2 hrs., either half-year. Sec. I (Bradley), Tu Th, 10. Sec. II (Woodworth) Tu Th, 1. Course 3 or 4 must be taken concurrently with this course.

2. Economic Entomology. Professor WOODWORTH.

Detailed studies of a series of the most injurious insects.

2 hrs., either half-year. Tu Th, 11. Course 3 or 4 must be taken concurrently with this course.

3. Supplementary Course.

Designed to supplement the lecture courses 1 and 2 but may be taken separately and students may register in more than one section. No credit except when taken for three or more units or concurrently with another course.

1–3 hrs., either half-year; 1 unit for each section. Sections: I, Coleman, M, 9; II, Severin (anatomy for course 2), M, 1–4; III, Woodworth, Tu, 9; IV, Woodworth (field work), Tu Th, 12; V, Coleman, W, 10; VI, Woodworth, W, 11; VII, Severin (anatomy for course 1), W, 1–4; VIII, Essig, Th, 9; IX, Bradley, F, 10.

4. Elementary Systematic Entomology. Assistant Professor BRADLEY.

The structure and classification of insects. Laboratory studies supplemented by field work.

6 hrs., laboratory and 3 hrs., field work; either half-year; 3 units. Tu Th, 1–4.

6. Parasites. Mr. FREEBORN.

Classification, biology, relation to disease, principles of control as applied to the commoner parasites of man and beast. Lectures and recitations.

3 hrs., first half-year. Tu Th, 10; a section meeting to be arranged.

27. Ecology. Associate Professor HERMS.

Animal communities; the relation of animals to their environment, including such topics as hunger and food, behavior, growth, adaptation and variation, social habits, insects and plants, aquatic habits, etc. Lectures, assigned reading, and written report on a given animal community. Bi-weekly quiz.

3 hrs., second half-year. M W F, 10.

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99. Practice in Entomology. The STAFF.

In the summer of 1915 a study of forest insects in the High Sierra was engaged in under the direction of Professor E. C. Van Dyke. In 1916 a mosquito-malaria survey of the State was undertaken in co-operation with the State Board of Health under the direction of Professor W. B. Herms. In 1917 the work consisted of a survey of the Monterey National Forest for honey plants and apiary sites under the direction of Mr. G. A. Coleman. In 1918 Professor Essig will have charge of a study of the insects of deciduous orchards.

6 weeks, beginning the day after Commencement; 6 units.

103. Special Problems.

Class or individual instruction. Students may register in more than one section.

6–12 hrs., either half-year; 2–4 units for each section. Laboratory hours to be arranged with instructor. Sections: I, Coleman (Homopterous insects and their parasites), II, Gray (Insecticide laws and decisions), III, Bradley, IV, Coleman (Apiculture), V, Woodworth (Microscope calculation and testing), VI, Severin, (Microscopical technique), VII, Essig, VIII, Herms (Parasitology), IX, Freeborn.

105A–105B. Apiculture. Mr. COLEMAN.

Anatomy, embryology and physiology of the honey bee, with practice in the more common manipulations in the apiary; apiary practice, including queen breeding; control of bee diseases, etc.

7 hrs., throughout the year; 3 units each half-year. Lecture, Tu, 1; laboratory and apiary work to be arranged. May be taken by lower division students in other departments by permission of instructor.

106A–106B. Insect Structure. Dr. SEVERIN.

The external and internal anatomy and the physiology of insects.

6 hrs., throughout the year; 2 units. Tu Th, 1–4.

112. Advanced Systematic Entomology. Assistant Professor BRADLEY.

Advanced study of the classification of insects.

9 hrs., either half-year; 3 units. M W F, 1–4, or by arrangement. Prerequisite: course 4.

*114. Forest Insects. Assistant Professor VAN DYKE.

Insects in their relationship to forests and woodlands.

2 hrs. lecture, 3 hrs. field work, either half-year; 3 units. Tu Th, 4. Prerequisite: course 4.

*Not to be given, 1917-18.

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116. Veterinary Parasitology.
Associate Professor Herms and Mr. Freeborn.

The relation of animal parasites and disease carriers to domesticated animals, with special emphasis placed on control. For students in veterinary science and animal industry. This course satisfies in full the requirements in parasitology in Class A veterinary colleges.

8 hrs., first half-year; 4 units. Lectures, M W, 10; laboratory, M W, 1–4. Prerequisite: Zoology 1A and Bacteriology 1, or equivalent.

117. Insecticide and Fungicide Preparation. Mr. Miller.

Laboratory practice in the preparation of the insecticides and fungicides which may be prepared on the farm; demonstrations of simple tests. Given only in conjunction with course 118 or other allied course.

3 hrs., first half-year; 1 unit. W, 2–5.

118. Insecticides and Fungicides. Assistant Professor Gray.

The chemistry and composition of remedies used for the control of parasites that infest vegetation and animals, including the source of raw materials, commercial, and home manufactures. Lectures and recitations.

3 hrs., first half-year. M W F, 8.

*121. Life History Work. Assistant Professor Van Dyke.

Method and practice in working out the life histories of insects in insectary and field.

6 to 9 hrs., either half-year; 2 or 3 units. Tu W Th, 1–4. Prerequisite: course 1, 2 or 4.

122. Floral and Landscape Entomology. Assistant Professor Essig.

The common insects which attack flowers and ornamental plants in California, their classification, life histories, and control. Lectures, illustrated by specimens and lantern slides, laboratory, and field work. For students in landscape gardening and floriculture, but open to all advanced students.

8 hrs., second half-year; 4 units. Lectures, M W, 4; laboratory, M W, 1–4.

124. Orchard Insects. Assistant Professor Essig.

The most important western insects attacking citrus, deciduous, nut and other orchard trees; classification, structure, life histories and control. Lectures illustrated with specimens and lantern slides.

Laboratory exercises based on the examination of living and prepared specimens from the orchards will be illustrative of the lectures. Field trips will be required also. For students in citriculture and pomology, but open to all upper division students.

8 hrs., first half-year; 4 units. Lectures, W F, 4; laboratory, W F, 1–4.

* Not to be given, 1917–18.

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126. Medical Parasitology. Associate Professor HERMS.

The role of animal parasites in the transmission and causation of human diseases; habits and control. For students in public health, hygiene, medicine, and sanitary science. Lectures and demonstrations.

4 hrs., second half-year; 3 units. M Tu W Th, 3. Prerequisite: Zoology 1A and Bacteriology 1.

127. Medical Parasitology Laboratory.
Associate Professor HERMS and Mr. FREEBORN.

Laboratory exercises involving the study of animal parasites of the human. Open to students who have had or are taking course 126 or equivalent.

6 hrs., second half-year; 2 units. M W, 1–4.

129A–129B. Undergraduate Thesis Course.

Professor WOODWORTH, Associate Professor HERMS, Assistant Professors BRADLEY, ESSIG, and GRAY.

An investigation of a special problem in entomology or parasitology with a typewritten report on the results. Open only to seniors.

6–15 hrs., throughout the year; 2–5 units. Hours to be arranged.

200A–200B. Seminar in Parasitology. Associate Professor HERMS.

Discussion of reports prepared by members of the class, based either upon investigations made by the students or upon special articles of importance. Required of all students in courses 129 and 201. The seminar may be repeated indefinitely without duplication of work.

1 hr., throughout the year. Tu, 4.

201A–201B. Research in Parasitology.
Associate Professor HERMS and Mr. FREEBORN.

12 or more hrs. throughout the year; 4 or more units. Hours to be arranged.

202A–202B. Research in Systematic Entomology.
Assistant Professors BRADLEY and ESSIG.

The revision of a group of insects.

12 or more hrs., throughout the year; 4 or more units. Hours to be arranged.

205A–205B. Research in Insect Biology.
Professor WOODWORTH and Dr. SEVERIN.

Problems in the structure or physiology of insects or the action of insecticides.

12 or more hrs. throughout the year, to be arranged.

218A–218B. Research in Insecticides.
Assistant Professor GRAY and Mr. MILLER.

Investigation of special problems.

12 or more hrs., throughout the year; 4 or more units. Hours to be arranged.

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FARM MECHANICS

(Given at Davis)

2. Shop Practice: Carpentry. Mr. BELTON.

The care and use of wood-working tools. Laying off work, joining, framing and construction of models and sections of buildings. The practice work is supplemented with lectures and demonstrations.

6 hrs., second half-year; 2 units. M Tu, 8–11.

3. Shop Practice: Blacksmithing. Mr. INGRIM.

Principles of forging and welding; making and tempering hand tools; sharpening and repair of farm implements.

6 hrs., second half-year; 2 units. W Th, 8–11.

101. Farm Machinery and Farm Motors. Professor DAVIDSON.

Economics of farm machinery, mechanics of machines, materials of construction. The development, construction, functions, adjustment, operation, and repair of farm machinery. The production and transmission of power. Principles of draft. The study of the horse as a motor; gasoline and oil engines; electric power; tractors. Laboratory work will consist of the study, operation, and adjustment of the machines discussed in the classroom.

8 hrs., second half-year; 4 units. Lectures: Sec. I, Tu Th, 8; Sec. II, Tu Th, 9. Laboratory: Sec. I, M F, 8–11; Sec. II, M, 1–5; Tu, 3–5; Sec. III, W, 9–11; F, 1–5.

102. Dairy Mechanics. Professor DAVIDSON and Mr. FLETCHER.

Conducted in coöperation with Division of Dairy Industry. Lectures on the management and repair of steam boilers and gas engines, electric motors, pumps, refrigerating machinery, creamery machinery; construction of cold storage rooms. Practice work in soldering, babbitting, pipe fitting, erection of shafting, flue fitting and testing and the actual operation of a creamery power plant.

4 hrs., second half-year; 2 units. Hours to be arranged.

FORESTRY

1. Elements of Forestry. Professor MULFORD.

The relations of forestry to the everyday life of a nation. The influence of forests upon water supply, climate, soil and public health; the products of the forest; the life story of the tree and the forest; general principles of forestry practice; protection of the forest from fire and other enemies; present organization of forestry work in the United States and Europe. Several lectures on fish and game protection will be given by Dr. H. C. Bryant, of the California Fish and Game Commission.

3 hrs., second half-year. Sec. I, M W F, 9; Sec. II, Tu Th S, 10.

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2. Forestry Methods. Assistant Professor METCALF.

Identification of common woods used by the carpenter and the cabinet maker; identification of the principal timber trees of the Pacific Coast; uses of various kinds of wood; tree seeds; forest nurseries; starting forests by direct seeding and by planting; measurement of the contents of felled and standing trees; methods of determining the value of standing timber. Lectures, laboratory, and field work.

5 hrs., first half-year; 3 units. Lectures, M W, 9; laboratory: Sec. I, M, 1–4; Sec. II, Th, 1–4.

Either course 1 or 2 may be taken separately without prerequisite; the two courses should meet the needs of students who wish a general knowledge of forestry and its methods, but who do not wish the detailed professional courses listed below.

99. Practice in Forestry.

Assistant Professor BRUCE in charge; Professors MULFORD and MASON, and Assistant Professor PRATT.

Practice in scaling and estimating timber and the study of its growth; timber survey of a large tract; detailed study of logging and milling operations; field instruction in silviculture; collection of data for a working plan.

Eleven weeks, summer camp; 6 units. To be held in the pine region of the Sierra or in the redwood region, near large logging operations.

Woodsmanship.

While in camp for course 99, instruction in woodmanship will be given. Students who make forestry their major subject will be required to become reasonably proficient in woodsmanship. No credit.

101. Forest Mensuration. Assistant Professor BRUCE.

The measurement of saw logs and other manufactured products, of standing timber, and of the growth of trees and stands.

6 hrs., second half-year; 3 units. Lectures, M W, 11; laboratory and field work, Tu, 1–4.

104. Silviculture: Forest Ecology and Natural Reproduction.

Professor MULFORD.

The influence of site on the forest and of the forest on site; the behavior of trees as members of a forest community; forest description; the methods of reproducing the forest without planting or sowing; the care of the crop during its growth; timber scale marking.

7 hrs., second half-year; 5 units. Lectures, Tu Th F S, 8; field work, S, 9–12.

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106. Silviculture: Artificial Reproduction. Assistant Professor METCALF.

Tree seeds; direct seeding; the forest nursery; forest planting; woodlot and windbreak planting; fixation of sand dunes.

4 hrs., first half-year; 2 units. Lecture, F, 10; laboratory or field work, Tu, 1–4.

108. Timber Trees and Forest Regions. Assistant Professor METCALF.

Brief survey of the forest regions of the world; detailed account of the forest regions of the United States and Canada; the distribution, importance, and silvical characteristics of the leading timber trees of the United States and Canada, and the identification of such of these as do not grow in California. (The identification of California trees is given in Botany 104A.)

6 hrs., first half-year; 3 units. Lectures, Tu Th, 8; laboratory, S, 8–12.

110. Forest Protection. Professor MASON.

The protection of forests from fire, insects, fungi, trespass, etc.

5 hrs., second half-year; 3 units. Lectures, Tu Th, 10; conference, W, 1–4.

112. Forest Utilization. Assistant Professor PRATT.

The manufacture, seasoning, grading, and care of rough and finished lumber; the principal industrial uses of lumber; minor wood-using industries; utilization of products other than wood, such as forage, fish, and game.

5 hrs., first half-year; 3 units. Lectures, Tu Th, 9; laboratory, F, 1–4.

114. Wood Technology. Assistant Professor PRATT.

Identification of economic woods; physical, chemical and mechanical properties of wood; utilization of waste; technical forest products; wood preservation; paper pulp; destructive distillates.

5 hrs., first half-year; 3 units. Lectures, M W, 11; laboratory, W, 1–4.

115. Logging. Assistant Professor BRUCE.

The manufacture and transportation of saw logs from stump to mill.

5 hrs., second half-year; 3 units. Lectures, M W, 9; laboratory, Th, 1–4.

118. Forest Improvements. Assistant Professor BRUCE.

The construction and maintenance of forest trails, roads, bridges, and telephone lines.

5 hrs., second half-year; 3 units. Lectures, Tu Th, 9; laboratory, F, 1–4.

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120. Forest Finance and Organization. Professor MASON.

Forest finance, including compound interest in forest calculations; appraisal of timber and forest soil; damages; taxation; timber bonds; timber insurance; regulation of timber cut; forest working plans.

7 hrs., second half-year; 5 units. Lectures, Tu Th F S, 8; conference. S, 9–12.

122. Forest Economics, Administration, and History. Professor MASON.

Timber supply of the world and nation, its amount, location, use, replenishment, etc.; economic situation of the lumber industry; National Forest administration; the application of the principles of scientific management to forest administration; forest policy and its expression in important forest laws; historical development of forestry.

6 hrs., second half-year; 4 units. Lectures, M W F, 10; conference, M, 1–4.

128. Conference. Assistant Professor PRATT.

Round-table discussions of forestry problems; individual topics of study will be assigned.

3 hrs., first half-year, to be arranged. Open only to students with a major in forestry.

202A–202B. Research.

Professors MULFORD and MASON, and Assistant Professors BRUCE, PRATT and METCALF.

Individual advanced study and research in silviculture, forest management, forest engineering, forest utilization, wood technology, forest protection, or forest policy.

3 to 6 hrs., throughout the year, to be arranged.

COURSES IN OTHER DEPARTMENTS

Industrial Hygiene. [See Hygiene 6.]

Agrostology. [See Agronomy 108.]

Forest Botany. [See Botany 104A.]

Forest Insects. [See Entomology 114.]

Surveying. [See Civil Engineering 1A–1B, 3, 102, 102C.]

Tree Surgery. [See Landscape Gardening 108.]

Strength of Materials. [See Civil Engineering 108ABC.]

Elements of Steam Engineering. [See Mechanics 1A.]

Elements of Electrical Engineering. [See Electrical Engineering 1B.]

Principles of Accounting. [See Economics 14A–14B.]

Factors of Industrial Efficiency. [See Economics 121.]

Cost Accounting. [See Economics 161.]

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GENETICS

1. Principles of Breeding Plants and Animals.
Professor BABCOCK and Assistant Professor CLAUSEN.

Study of variation and heredity with reference to plant and animal improvement.

6 hrs., second half-year; 4 units. Two lectures, one recitation and one laboratory period per week. Lectures, Tu Th, 8. Recitations, Secs. 1, 2, M, 8; 3, 4, W, 8; 5, 6, F, 8. Laboratory, Sec. I, W, 2–5; II, Tu, 2–5; III, M, 2–5. Prerequisite: Botany 2, 3 and Zoology 1A.

120. Special Topics and Pro-seminar.
Professor BABCOCK and Assistant Professor CLAUSEN.

Individual study of selected topics, the results to be embodied in a report or thesis. Laboratory or field work with reading. Weekly meetings with reports and discussions on topics in genetics.

7 to 13 hrs., either half-year; 3 to 5 units. Pro-seminar, and laboratory or field work to be arranged. Prerequisite: course 1. May be repeated without duplication of credit with instructors' permission.

200. Research. Professor BABCOCK and Assistant Professor CLAUSEN.

Units and hours to be arranged.

EXPERIMENTAL IRRIGATION

(Given at Davis)

120. Irrigation Practice. Assistant Professor BECKETT.

Practical field problems in the preparation of land, conveyance, measurement and application of water to various crops.

7 hrs., second half-year; 3 units. Lecture, W, 10; laboratory, Sec. I, M F, 8-11; II, Tu, 3–5; W, 1–5; III, Tu, 1–4; S, 9–12. Prerequisite: Irrigation 113, Civil Engineering 1A or 1E.

121. Special Problems in Irrigation Practice.
Assistant Professor BECKETT.

The preparation of land and application of water to various crops. especially in relation to the rates of application, rate of flow of water over the land, and distribution of moisture in the soil following irrigation.

7 hrs., second half-year; 3 units. 1 hr. lecture, two 3-hr. periods field work, to be arranged.

Open to students who are taking or who have taken course 120.

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LANDSCAPE GARDENING AND FLORICULTURE

1. Plant Propagation. Professor GREGG.

A study of the methods of securing and perpetuating desirable varieties of plants—seedage, division, layerage, cuttage, budding, and grafting. Lectures, reports, and practical exercises.

6 hrs., second half-year; 4 units. Lectures and recitations, M W F, 9; practice, five sections, I, F, 2–5; II, M, 2–5; III, W, 2–5; IV, Th, 2–5; V, Tu, 2–5.

99A. Practice in Landscape Gardening.
Professor GREGG and Assistant Professor STEVENS.

Summer course of six weeks arranged to give a general survey of the art of landscape gardening. Required of all students with a major in landscape gardening at the end of the junior year.

Beginning the day after Commencement; 6 units.

99B. Practice in Floriculture. Mr. CAREY.

Summer course of six weeks, arranged to give a general survey of the field of commercial floriculture, or to meet the needs of individual students. Required of all students with a major in floriculture at the end of the junior year.

Beginning the day after Commencement; 6 units.

101. The Ornamentation of Home Grounds.
Professor GREGG and Assistant Professor STEVENS.

The principles of design as applied to home grounds, together with the correct use of the best plant materials for such areas. Lectures, assigned readings, and reports.

2 hrs., second half-year. M W, 10.

103. The Theory and Aesthetics of Landscape Gardening.
Professor GREGG.

The different styles of landscape art and the principles governing correct design.

6 hrs., first half-year; 4 units. Lectures, M W F, 9; drafting, W, 2–5. Required of all students with a major in landscape gardening, and open to students in architecture and engineering.

104A–104B. Plant Materials. Assistant Professor STEVENS.

The form, habit, texture, and adaptations of trees, shrubs, vines, and herbaceous plants with reference to their value and use in landscape design.

6 hrs., throughout the year; 2 units each half-year. First half-year, Tu, 8–10; S, 8–12; second half-year, W, 9–11; S, 8–12. Prerequisite: Botany 2 and 3.

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104C. Plant Materials. Assistant Professor STEVENS.

Advanced study of plant adaptation.

6 hrs., first half-year; 2 units. W, 9–12; Th, 8–11.

105. Elementary Landscape Gardening. Assistant Professor STEVENS.

The simpler problems of design with special reference to small areas, their reconstruction and improvement, from paced, chain, and plane table surveys, together with reports, estimates, and sketches.

10 hrs., second half-year; 4 units. Lecture, M, 1; drafting, M W F, 2–5. Prerequisite: courses 103 and 104A.

106A–106B. Advanced Landscape Gardening. Professor GREGG.

The more advanced problems of design and reconstruction from topographic and transit surveys as offered by the larger areas of parks, playgrounds, and country estates, with detailed plans, reports, and estimates.

12 hrs., throughout the year; 4 units each half-year. M, 9–12; Tu Th F, 2–5. Prerequisite: course 105.

107. History and Literature. Assistant Professor STEVENS.

The history and literature of landscape gardening with special reference to early influences as they govern modern design.

2 hrs., first half-year. Lectures, M F, 1. Required of all students with a major in landscape gardening, and open to students in architecture and engineering.

108. Tree Surgery. Mr. CAREY.

The most approved methods of caring for ornamental trees; the technical details of planting, pruning, and spraying, bolting, chaining, and cavity work; shade tree legislation and the duties of shade tree commissions and tree wardens.

4 hrs., first half-year; 3 units. Lectures, W, 1; laboratory, F S, 8–11.

109. Home Floriculture. Assistant Professor STEVENS.

The propagation and culture of the more common annuals, herbaceous perennials and bulbous plants grown in California gardens; the preparation of soils and the planting of flower beds; the use of fertilizers and the preparation and application of spraying materials. Lectures, assigned reading, garden and greenhouse work.

5 hrs., second half-year; 2 units. Lectures, Tu Th, 11; laboratory, Tu, 2–5.

102A–102B. Commercial Floriculture. Mr. CAREY.

The growing of the principal florists' crops on a commercial scale, both under glass and in the field. Lectures, reports, greenhouse, and field work.

6 hrs., throughout the year; 4 units each half-year. Lectures, M W F, 1; laboratory, Tu, 2–5. Prerequisite: course 1, Botany 2 and 3.

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201. Modern Civic Art. Professor GREGG.

Advanced problems in design with special reference to city parks, municipal park systems, recreation areas, civic centers and other civic features, as they form an intimate part of the city plan as a complete whole. Lectures, outside reading, and the preparation in various forms, of plans, specifications, estimates and reports.

24 hrs., first half-year; 8 units. Hours for consultation and criticism to be arranged. Allied subjects in engineering and architecture and other departments of the University, as recommended by the instructor, should be elected to parallel this course.

202A–202B. City and Town Planning. Professor GREGG.

Advanced problems in planning and designing. The economic and aesthetic problems involved in the systematic planning and development of American cities. The progress of all phases of city and town planning in this and European countries is made the basis of all lectures and outside reading. Extensive, practical projects are outlined and plans and specifications prepared for the development of new cities and towns and the replanning of others for their best economic and aesthetic development.

24 hrs., throughout the year; 8 units each half-year. Hours to be arranged. Recommended allied subjects as offered by other departments of the University must parallel this course.

NUTRITION

2. Pure Food and Drug Laws and their Operation.
Associate Professor LEA.

The history of food legislation; critical discussion of national, state, and municipal laws on food inspection and control; the use of preservatives; adulteration and misbranding of foods; human foods and those for cattle and poultry. Lectures and recitations.

2 hrs., first half-year. M W, 8.

99. Practice in Nutrition. Professor JAFFA.

Arrangement for practice course requirements for students whose major is nutrition may be made by consultation with the head of the division.

106. Feeds and Feeding. Professor JAFFA.

The composition and use of cattle and poultry foods; compounding of rations; practical application of the principles of animal nutrition to the rational feeding of farm animals. Lectures and recitations.

2 hrs., first half-year; 2 units. Tu Th, 1. Prerequisite: inorganic chemistry.

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109. Laboratory Course in Dairy Chemistry. Mr. ALBRO.

Qualitative chemical, and microscopical methods for examination of milk, butter, other dairy products and commercial milk foods, and detection of preservatives and adulterants.

7 hrs., first half-year; 3 units. Laboratory, M W, 1–4; 1 hr. lecture to be arranged. Prerequisite: Chemistry 5.

10 hrs., first half-year; 4 units. By special arrangement.

114. Fundamentals of Nutrition. Assistant Professor MATTILL.

Designed to give the general student a familiarity with the nature and functions of food, and the mechanism involved in its digestion and utilization.

2 hrs., first half-year. Tu Th, 2. Prerequisite: inorganic chemistry.

116. Foods and Food Products. Professor JAFFA.

A detailed study of food materials, their physiological values and economic importance. Discussion of standards and dietaries.

2 hrs., second half-year. Tu Th, 2. Prerequisite: inorganic chemistry; organic chemistry recommended..

117. Laboratory Course in Food Analysis.
Assistant Professor MATTILL and Mr. ALBRO.

Chemical and microscopical methods for examination and analysis of foods, and methods for detection of adulteration. Nature of the materials studied will depend upon the interest and preference of the student. Opportunities for advanced work may be offered.

7 or 10 hrs., either half-year; 3 or 4 units. Hours to be arranged. Prerequisite: Chemistry 5.

119. Advanced Course in Food Chemistry.
Associate Professor LEA and Mr. ALBRO.

A critical study of methods of determining the purity and quality of food products with special reference to the requirements of food and drug laws.

7 hrs., second half-year; 3 units. Lecture to be arranged; laboratory, M W, 1–4.

9 hrs., laboratory; 1 hr. lecture; 4 units; by special arrangement. Prerequisite: course 117 or Agricultural Chemistry 101A–101B.

120. Pro-seminar in Nutrition. Professor JAFFA.

A critical study of the methods of feeding large groups and a discussion of the problems involved in the management of the commissary departments of institutions, industrial and agricultural organizations, camps, etc.

2 hrs., second half-year, to be arranged.

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126. Advanced Nutrition. Assistant Professor MATTILL.

The chemistry and physiology of alimentation and a detailed study of the processes of metabolism involved in the nutrition and growth of animals.

3 hrs., first half-year, to be arranged. Prerequisite: Chemistry 1A–1B, 8A–8B; Physiology, and Agricultural Chemisty 101A–101B recommended.

127. Laboratory Course in Advanced Nutrition.
Assistant Professor MATTILL.

A study of digestion and metabolism, with practice in nutrition experiments on animals and man. Designed to accompany course 126.

6 hrs., first half-year; 2 units. Hours to be arranged. Prerequisite: Chemistry 1A–1B, 5, 8A–8B; Physiology, and Agricultural Chemistry 101A–101B recommended.

129. Problems in Nutrition and Food Chemistry.
Professor JAFFA, Assistant Professor MATTILL and Mr. AIBRO.

Hours and credit to be arranged. Thesis work may be included in this course.

230. Seminar in Foods and Nutrition. Professor JAFFA.

Discussion of recent work in food chemistry and feeding experiments with the interpretation of laboratory results. Nutrition aspects of the processes of manufacturing and preserving foods.

2 hrs., first half-year, to be arranged.

231. Research in Food Chemistry and in Nutrition.
Professor JAFFA and Assistant Professor MATTILL.

Hours and credit to be arranged.

232. Seminar in Nutrition and Metabolism.
Assistant Professor MATTILL.

Discussion of original papers in recent journals as a stimulus to further investigation.

2 hrs., bi-weekly, second half-year; 1 unit.

OLERICULTURE

(Given at Davis)

101. Vegetable Gardening. Associate Professor ROGERS.

General principles of vegetable gardening; detailed directions for the production and marketing of vegetables under California conditions, supplemented by practical work in the garden.

8 hrs., second half-year; 4 units. Lectures, Tu, 11; W, 10; 6 hrs. practicums to be arranged.

201. Advanced Work in Vegetable Gardening.
Associate Professor ROGERS.

Hours and credit to be arranged.

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PLANT PATHOLOGY

99. Practice course. Professor SMITH and Associate Professor HORNE.

Students with a major in plant pathology should register for this course not later than the middle of the junior year or after completing course 120. The course may be given either during the college year or in vacation, according to the material available and the circumstances of the individual student. The work will consist mainly in trips to various parts of California where the student may make field studies upon the nature, economic importance and practical control of representative plant diseases. 6 units. Not required of students with a major in plant pathology who have completed Agronomy 99, Citriculture 99, Pomology 99 or Soils 99.

120. The Diseases Affecting Cultivated Plants in California. Associate Professor HORNE and Assistant Professor E. H. SMITH.

Lectures and laboratory studies on diseases of economic plants. A beginning course required of juniors whose major is plant pathology but intended also for other students who desire a general idea of the subject.

8 hrs., first half-year; 4 units. Lectures, Tu Th, 8; laboratory, section I, Tu Th, 9–12; II, Tu Th, 1–4. Prerequisite: junior standing in the College of Agriculture or a reasonable equivalent.

121. Special Undergraduate Study. Associate Professor HORNE.

A course for students who wish to do further laboratory work after completing course 120.

Second half-year; hours and credit to be arranged in each case. Prerequisite: course 120.

122A–122B. Advanced Course. Professor SMITH, Associate Professor HORNE, and Assistant Professor E. H. SMITH.

The principles of pathology, nature of disease, and the chief disease-inciting influences; disease-producing organisms, their development, activities and relation to host plants by means of microscopic, cultural, histological, and infection methods. Systematic review of important diseases. Lectures, laboratory, and collateral reading. Required of seniors whose major is plant pathology.

8 hrs., throughout the year; 4 units each half-year. Lectures, M W, 8; laboratory, M W, 9–12. Prerequisite: course 120 and Botany 105A.

125A–125B. Special Topics. Professor SMITH, Associate Professor HORNE, and Assistant Professor E. H. SMITH.

Laboratory or field study of an assigned topic, with preparation of a thesis.

2 units, either half-year.

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126A–126B. Pro-seminar.
Professor SMITH, Associate Professor HORNE, and Assistant Professor E. H. SMITH.

Papers and discussions by members of the class on various topics of interest in connection with work in the various courses. Required of all students whose major is plant pathology. Open to other students taking courses 121, 122, or 230.

1 hr., throughout the year. W, 4.

230. Graduate Research.
Professor SMITH, Associate Professor HORNE, and Assistant Professor E. H. SMITH.

Original investigations of special problems.

POMOLOGY

99. Practice in Pomology. Assistant Professor TAYLOR and Mr. SWEET.

A summer course intended to familiarize the student with orchard practice and fruit-handling as carried on in some of the principal fruit districts of the state. Details will be arranged to suit the needs and requirements, as far as possible, of individual students. 6 units. Required of all students with a major in pomology at the close of the junior year. Arrangements for registration must be made with the Head of the Division before April 15.

101. General Principles of Fruit Growing.
Assistant Professor TAYLOR and Mr. SWEET.

Lectures and recitations.

3 hrs., first half-year. M W F, 9. Required of all juniors with a major in pomology. Open to juniors with a major in citriculture and viticulture and to a limited number of other juniors by special permission.

102. Orchard Fruits. Assistant Professors TAYLOR and HENDRICKSON.

Deciduous tree fruits and nuts; their classification, propagation, planting, management. Care of orchards, adaptability of tree fruits to California and Pacific Coast conditions. Attention will also be given to small fruits. Lectures and recitations.

3 hrs., first half-year. M W F, 10. Required of seniors with a major in pomology. Prerequisite: course 101.

103. Orchard Practice. Assistant Professor HENDRICKSON.

A laboratory course designed to give the student actual practice under orchard and field conditions in the various operations of deciduous fruit production; propagation, planting, pruning, spraying, etc. Given at Davis.

9 hrs., second half-year; 3 units. W F, 1–5:30. Required of all juniors with a major in pomology. Prerequisite: course 101.

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104. Fruit Transportation, Storage and Marketing.
Professor ——— and Mr. SWEET.

General principles underlying the harvesting, grading, packing, shipping, pre-cooling, storing, and marketing of fruits. The practices involved in the handling and movement of fruit crops, and their utilization. Lectures and recitations.

3 hrs., second half-year. M W F, 10. Prerequisite: course 101 or 120, or Citriculture 101 or 102, or Viticulture 116.

105A–105B. Pro-seminar. Assistant Professor TAYLOR and Mr. SWEET.

A study of pomological literature, experiment station and government publications bearing on pomological topics; the principles and methods of outlining and conducting experimental work; library references. Discussions and reports.

2 hrs., throughout the year. M, 3–5. Required of seniors and graduate students whose major is pomology. Not open to students in other divisions.

106. Systematic Pomology. Assistant Professor HENDRICKSON.

A technical study of fruit varieties, their botanical and varietal relationships; description, identification scoring and judging. Laboratory work with informal lectures and recitations.

6 hrs., first half-year; 2 units. Th F, 1–4. Required of all seniors with a major in pomology. Prerequisite: course 101.

107. Nuciculture. Assistant Professor TAYLOR.

Nut fruits, including the almond, walnut, pecan, chestnut, filbert and others. Classification, propagation, location and management of orchards, harvesting, marketing and utilization. Lectures and recitations.

3 hrs., second half-year. Tu Th S, 10. Prerequisite: course 101 or 120, or Citriculture 101 or 102, or Viticulture 116.

120. General Pomology. Assistant Professor TAYLOR and Mr. SWEET.

The principles underlying the production of the various fruits, their handling and marketing. For students who have not the time for the more technical courses. Not open to students whose major is pomology. Lectures, recitations, and laboratory work.

6 hrs., first half-year; 4 units. Lectures and recitations, M W F, 10; laboratory, section I, M, 1–4; II, W, 2–5; III, S, 9–12. Prerequisite: Botany 2 and 3. Open to sophomores by special permission.

201. Research. Assistant Professor TAYLOR.

Open to graduate students who desire to write theses. Field or laboratory research with correlated reading.

Hours and credit to be arranged. Prerequisite: courses 101, 102, 103, and 104, or equivalent.

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POULTRY HUSBANDRY

(Given at Davis)

99. Practice in Poultry Husbandry.
Associate Professor DOUGHERTY and Mr. LLOYD.

Practice in feeding and caring for pens of fowls, grinding and mixing feeds, caring for young chicks, running incubators, and all of the work necessary in the management of a poultry plant. Required of all students whose major is poultry husbandry. 6 units.

101. Poultry Husbandry.
Associate Professor DOUGHERTY and Mr. LLOYD.

The feeding, housing, breeding, and general management of poultry; study of the egg; anatomy and physiology of poultry; parasites and sanitation.

5 hrs., second half-year; 3 units. Lectures, Th F, 11; laboratory, F, 2–5.

102. Poultry Management.
Associate Professor DOUGHERTY and Mr. LLOYD.

A practice course in operating incubators, keeping records, hatching eggs, brooding chicks, feeding and caring for pens of fowls.

Second half-year; 3 units. Practice, M Tu W Th F S Sun, 8–9, 11–12, 4–5. Course 101 must precede or accompany this course.

104. Pro-seminar. Associate Professor DOUGHERTY and Mr. LLOYD.

Advanced study and discussion, including a review of literature.

4 hrs., second half-year; 2 units. Hours to be arranged. Prerequisite: courses 101 and 102.

105. Undergraduate Research.
Associate Professor DOUGHERTY and Mr. LLOYD.

Original investigation of a problem in poultry husbandry, the results to be presented in a thesis.

Second half-year; 1 to 3 units. Prerequisite: courses 101 and 102; must be preceded or accompanied by course 104.

RURAL INSTITUTIONS

201. Co-operation in Marketing. Professor MEAD.

Study of farmers' co-operative organizations, especially those organized for the purchase of farm supplies and selling of farm products; legislation of different countries designed to improve marketing facilities. Assigned readings and reports.

2 hrs., second half-year. Tu Th, 10.

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202. Rural Credits and Land Settlement. Professor MEAD.

A study of the rural credit and land settlement policies of other countries and of the methods and policies needed to promote rural development in the United States. Assigned readings and reports.

2 hrs., first half-year. Tu Th, 10.

SOILS AND FERTILIZERS

2. Soil Conditions and Plant Growth. Professor LIPMAN.

Fundamental principles involved in the relationships between soils and plant growth, including phases of soil chemistry, soil physics and soil bacteriology, and their relations to soil fertility.

3 hrs., first half-year. Tu Th S, 11. Prerequisite: Chemistry 1A–1B, Physics 1A–1B. Not open to students enrolled in the College of Agriculture.

122. Soil Chemistry as Related to Soil Fertility.
Professor LIPMAN and Assistant Professor GERICKE.

The chemical examination of soils, including short methods for some important determinations, and complete analyses. Laboratory and greenhouse exercises, recitations, and lectures.

9 hrs., first half-year; 3 units. M W F, 1–4. Prerequisite: Chemistry 1A–1B, 5, and Soil Technology 1.

123. Soil Bacteriology as Related to Soil Fertility. Professor LIPMAN.

Laboratory experiments illustrating the relation of soil bacteria to soil fertility. Methods for the bacteriological examination of soils; greenhouse and field experiments. Recitations and lectures.

9 hrs., second half-year; 3 units. M W F, 1–4. Prerequisite: course 122, Bacteriology 1.

126A–126B. Pro-seminar in Soils and Soil Fertility. Professor LIPMAN.

Discussion of papers read, before the class, on various topics of research in soils by the several members of the seminar.

1–2 hrs., throughout the year. F, 4–6. Required of all students in courses 122, 123, 127.

127. Special Problems. Professor LIPMAN.

Topics for undergraduate research in soils for senior theses or publications.

Hours to be arranged. Prerequisites on consultation with the instructor.

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235. Research in Soils and Soil Fertility. Professor LIPMAN.

Open to properly qualified graduate students who desire to write a thesis or prepare for publication a paper on some phase of the science of soils.

Hours to be arranged. Prerequisite: all the courses in soils above outlined or equivalent training.

236. Seminar in Soils and Soil Fertility. Professor LIPMAN.

Critical discussions of advanced research on topics of importance to the specialist in soils.

1–2 hrs., to be arranged. Prerequisite: graduate standing in Soils and Soil Fertility.

SOIL TECHNOLOGY

1. Soil Technology. Professor SHAW and Assistant Professor A. SMITH.

The origin, formation, classification, properties, and management of soils.

6 hrs., second half-year; 4 units. Lectures, M W F, 1; laboratory, Sec. I, M, 2–5; II, W, 2–5; III, F, 2–5. Prerequisite: Geology 1A or Geography 1A, and Agricultural Chemistry 1 and 2.

99. Practice in Soil Surveying.
Professor SHAW and Assistant Professor A. SMITH.

A six weeks' study of the methods of classifying and mapping soils, consisting of practical field work in soil surveying; the construction of base maps; and the preparation of reports on the surveyed areas. Alkali soils and their reclamation, the adaptation of crops to soils, problems of irrigation, drainage, and soil management. The field work will be supplemented by an inspection trip, covering a large part of the state.

6 units. Prerequisite: course 1.

101. Soils of the United States. Professor SHAW.

A study of the soil types, series and provinces of the United States covering the origin, formation, classification, properties, and management of the soils with reference to crop production in various regions.

3 hrs., second half-year. M W F, 10. Prerequisite: course 1.

102. Advanced Soil Physics.
Professor SHAW and Assistant Professor A. SMITH.

Physical composition of soils, soil structure, moisture relations and modifications. Laboratory and field work.

7 hrs., second half-year; 3 units. Tu Th, 1–4 and 1 hr. of conference to be arranged. Prerequisite: course 1. May be repeated without duplication of credit.

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103. Soils of California. Professor SHAW.

The classification, origin, formation, general character and present utilization of the soils of California, including a study of each of the important soil series occurring in the state.

2 hrs., second half-year. M W, 9. Prerequisite: junior standing in College of Agriculture; open to other students by permission.

VETERINARY SCIENCE

Courses in veterinary science may be counted either as major subjects in animal husbandry and dairy industry or as correlated courses, subject to the approval of the head of the divisions of animal husbandry and dairy industry.

100. Diseases of Farm Animals.
Professor HARING and Associate Professor HART.

The more common diseases of domesticated animals. For students in Berkeley who are unable to take advanced work in veterinary science at the University Farm.

5 hrs., second half-year; 3 units. Lectures, M W, 3; laboratory or clinic, F, 2–5.

111. Veterinary Science. Assistant Professor HAYES.

The anatomy, physiology, and pathology of domesticated animals; the more common diseases of horses, cattle, sheep, and swine. (Given at Davis.)

8 hrs., second half-year; 4 units. Lectures, W, 8, Th, 9; laboratory, Th, 3–5, F, 1–5.

117. Bacteriology of Milk, Sanitary Milk Production and Dairy Inspection. Professor HARING and Associate Professor HART.

The production and distribution of the various grades of milk from a sanitary standpoint. Students will be required to participate in the work of the University Dairy. The time will be about equally divided between bacteriological work in the laboratory and field work at the various dairies.

5 hrs., first half-year; 3 units. Lectures, Tu Th, 1; laboratory or clinic, Th, 2–5. Prerequisite: elementary bacteriology.

119. Thesis Course. Advanced Dairy Bacteriology.
Professor HARING, Associate Professor HART and Assistant Professor HAYES.

Original study in special topics. (Given at Berkeley and also at Davis.)

Hours and credit to be arranged. Prerequisite: Bacteriology 1 and course 117.

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200. Research in Dairy Bacteriology, Dairy Sanitation and Animal Hygiene.
Professor HARING, Associate Professor HART and Assistant Professor HAYES.

Laboratory and field research on special topics. (Given at Berkeley and also at Davis.)

Hours and credit to be arranged.

Veterinary Parasitology. Associate Professor HERMS.

(See Entomology 116.)

VITICULTURE AND ENOLOGY

99. Practice in Viticulture and Enology.

Students whose major is in this division may satisfy the requirements of this course by six weeks special work in the zymological laboratory during the sophomore or junior year or by taking Course 99 in one of the following divisions: agronomy, pomology, citriculture or soil technology. The particular subject chosen must be selected by the student in consultation with the instructor in charge of his major subject.

116. Viticulture. Professor BIOLETTI.

Methods of establishing and maintaining vineyards, with special reference to conditions existing in California.

3 hrs., second half-year. M W F, 9.

117. Ampelography and Viticultural Laboratory.

Study of the structure, physiology and diseases of the vine.

9 hrs., second half-year; 3 units. M W F, 1–4. Course 116 must accompany or precede this course.

112. Industrial Zymology: Fruit and Vegetable Products.
Assistant Professor CRUESS.

The nature and control of the micro-organisms and the chemical and physical principles concerned in the fermentation and preservation of fruit and vegetable products, especially unfermented fruit juices, canned fruits and vegetables, jellies, fruit acids, denatured alcohol, and vinegar. Lectures.

3 hrs., second half-year. M W F, 8.

114. Vinification. Professor BIOLETTI.

Lectures on the principles and methods of wine-making.

3 hrs., first half-year. M W F, 9.

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115. Zymology: Fruit and Vegetable Products.
Assistant Professor CRUESS.

The methods and principles of the manufacture of fruit and vegetable products, especially fruit juices, canned fruits and vegetables, jellies, citrus by-products, vegetable oils and fermented products, such as vinegar, wine, cider and lactic acid.

9 hrs., second half-year; 3 units. M W F, 1–4. Course 112 must accompany or precede this course. Prerequisite: Bacteriology 1.

122. Enological Laboratory I. Mr. ZION.

Physical and chemical examination of grapes, and laboratory study of the processes of wine-making, wine handling and the microscopical examination of wine.

10 hrs., first half-year; 4 units. Lecture, F, 4; laboratory, M W F, 1–4. Course 114 must accompany or precede this course.

199. Undergraduate Theses and Pro-seminar.
Professor BIOLETTI and Assistant Professor CRUESS.

For undergraduate students in the preparation of senior theses and as an introduction to research work. Each student will pursue a special investigation and report the results in a carefully prepared paper. Subject and time to be chosen by the student with the advice and approval of the instructor.

The following courses are designed for students who have finished the corresponding undergraduate courses and who desire to study special problems. The hours and units are to be arranged with the instructors concerned.

233. Research in Viticulture. Professor BIOLETTI.

236. Research in Enology. Professor BIOLETTI.

237. Research in Zymology.
Professor BIOLETTI and Assistant Professor CRUESS.

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ANATOMY

HERBERT MCLEAN EVANS, B.S., M.D., Professor of Anatomy.
ROBERT O. MOODY, B.S., M.D., Associate Professor of Anatomy.
GEORGE W. CORNER, A.B., M.D., Assistant Professor of Anatomy.
PHILIP E. SMITH, Ph.D., Instructor in Anatomy.
KATHERINE J. SCOTT, A.B., M.D., Instructor in Anatomy.

The department is equipped for investigation in the fields of systematic anatomy, neurology, histology and embryology. The equipment includes a library of the chief anatomical periodicals and monographic literature and special facilities for experimental work.

Microscopic Anatomy

101. Histology and Microscopic Organology.
Professor EVANS, Dr. SCOTT, and ——.

The course will be given from the viewpoint of the activities of the living cell, the relation between structure and function being held uppermost. At the same time opportuniity will be afforded for a comprehensive review of human and comparative histology. Individual loan collections will supplement the laboratory work.

First half-year. 3 laboratory periods, 3 lectures a week; 6 units. M W, 8–12; F, 8–11; S, 11–12. Prerequisite: chemistry, physics and elementary biology (zoology, botany, physiology.)

103. Organs of Special Sense and Neurology.
Dr. SMITH and Dr. SCOTT.

The macroscopic and microscopic architecture of the central nervous system and the organs of special sense. The neuron studied in course 101 will be used as the unit in the construction of the nervous system, with a view to tracing origin, development, and final arrangement of the different pathways for nerve impulses.

5 hrs., second half-year; 3 units. Lectures, F, 8, 1; laboratory, F, 2–5.

Systematic Human Anatomy

102. General Human Anatomy. Associate Professor MOODY.

A study of the human body. Demonstrations and laboratory study of prepared human dissections, models, and microscopic slides. For students of public health and physical education. Other non-medical students may be admitted by arrangement with instructor, if size of class permits. A deposit of $2.50 will be required to cover cost of material; any unused portion of this sum will be returned.

5 hrs., second half-year; 3 units. Demonstration, Tu Th, 9; laboratory W, 1–4. Prerequisite: Zoology 1A or Physiology 1.

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105. Systematic Human Anatomy.
Associate Professor MOODY, Assistant Professor CORNER, and Dr. SMITH.

The systematic dissection of the human body. For convenience the work is divided into thirds or "parts," to wit: head and neck, arm and thorax, leg and abdomen. To better facilitate instruction students in the Medical School are required to finish each part in accordance with a prescribed time schedule.

27 hrs., first half-year; 10 units. Tu Th, 8–12; S, 8–11; M Tu W Th F, 1–5.

108. Regional and Topographical Anatomy.
Associate Professor MOODY and Assistant Professor CORNER.

Living models, special dissections, and sections of the body are used to enable the student to become more familiar with structural relations and to assemble information obtained in preceding dissections. Students who are accepted for course 213 may substitute that course for course 108.

4 hrs., first half-year; 3 units. Sec. I, Tu, 8; F, 8–11; Sec. II, Tu, 9; W, 1–4. Prerequisite: course 105.

109. Anatomy for Physicians and Advanced Students.
Professor EVANS, Associate Professor MOODY and Assistant Professor CORNER.

Hours to be arranged.

209. Human Embryology. Professor EVANS.

A laboratory study of specific problems in the development of the human embryo. Access will be given to a considerable private collection and its related data. Open only to students familiar with vertebrate embryology.

Hours to be arranged.

*210. History of Anatomy. Assistant Professor CORNER.

Informal conferences upon the history and literature of anatomy and its relation to the progress of general medical knowledge, illustrated by old books and figures. Class limited to six students.

1 hr., first half-year, to be arranged.

211. Physiological Anatomy of Reproduction.
Assistant Professor CORNER.

Informal conferences and demonstrations. The oestrous cycle, implantation, comparative placentation, etc. Outside reading required.

1 hr., first half-year, to be arranged.

*Not to be given, 1917-18. The course will be given alternately with course 211.

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212. Experimental Embryology. Dr. SMITH.

Conferences and original work by the experimental method, chiefly with amphibian material on problems of developmental mechanics.

Second half-year. Hours to be arranged.

213. Original Investigation.

Professor EVANS and Members of the Staff.

Students and others who are prepared to undertake research in any of the anatomical sciences will be given facilities and encouragement by members of the staff. Time devoted by the majority of the second-year medical class to course 108 may be applied here by those specially qualified.

Hours to be arranged.

214. Seminar. Professor EVANS.

Topics will be discussed by the staff and those electing the course. For the year 1917-18, topics will be chosen from the field of human and comparative embryology.

Hours to be arranged.

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ANTHROPOLOGY

[1]A. L. KROEBER, Ph.D., Associate Professor of Anthropology and Curator of the Anthropological Museum.

ROBERT H. LOWIE, Ph.D., Associate Professor of Anthropology.

T. T. WATERMAN, Ph.D., Assistant Professor of Anthropology.

EDWARD W. GIFFORD, Associate Curator of the Anthropological Museum.

THEODORE GRAY, A.B., LL.B., Teaching Fellow in Anthropology.

Students who expect to take only one course in anthropology during their college career are advised to elect courses 1A, 1B.

Honor-students in the upper division.—Course 1A–1B is prerequisite to honor-work in the upper division. The requirement of 24 units in major courses must normally include courses 102A, 103A, 103B, 105A, 105B, and 199A–199B.

LOWER DIVISION COURSES

1A. General Anthropology: Origin and Antiquity of Man. The Staff.

Man as an animal; heredity; races and their distribution; earliest culture.

3 hrs., first half-year. M W F, 9, and section meetings.

1B. General Anthropology: Origin and Development of Civilization. The Staff.

The source and growth of institutions, arts, customs, industries, language, and religion.

3 hrs., second half-year. M W F, 9, and section meetings.

UPPER DIVISION COURSES

MAJOR COURSES

102A. Ethnology: Growth of Institutions. Associate Professor LOWIE.

The sexes in society; marriage, kinship, exogamy, and descent; totemism; caste; wealth and its influence; gentile, political, and constitutional organization.

3 hrs., first half-year. M W F, 2.

103A. Ethnography. Associate Professor LOWIE.

The native tribes and nations of Oceania and Africa. Lectures and conferences.

3 hrs., first half-year. M W F, 4.

[1] In residence first half-year only, 1917–18.

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103B. Ethnography. Associate Professor LOWIE.

The peoples and cultures of Europe, Asia, and America.

3 hrs., second half-year. M W F, 4.

105A. Ethnology of North America. Associate Professor KROEBER.

The native peoples and indigenous civilizations of America north of Mexico. Lectures and conferences.

5 hrs., first half-year. M W F, 10, and consultation hours to be arranged. Open to students who have received at least second grade in courses 1A, 1B.

105B. Ethnology of Mexico and Central America. Assistant Professor WATERMAN.

The native peoples of Mexico and Central America, past and present, and the more important archaeological sites. Lectures, recitations, and the preparation of a paper.

3 hrs., second half-year. M W F, 2. Open to students who have received at least second grade in courses 1A, 1B.

*132. Anthropology of the Bible. Associate Professor KROEBER.

The Old Testament as an historical document in the light of archaeology and anthropology.

3 hrs., second half-year. M W F, 10.

137. Indians of California. Mr. GIFFORD.

Origins and relationships of the natives; prehistoric remains; shell mounds. Tribal divisions; arts; customs, industries, and beliefs.

3 hrs., second half-year. M W F, 9.

150. Phonetics. Assistant Professor WATERMAN.

Classification of speech sounds and the structure and arrangement of the speech organs. Practice in recording phonetically several European, American Indian, and other languages, with native informants.

2 hrs., second half-year. Tu Th, 2.

*151. Types of Linguistic Structure. Associate Professor KROEBER.

The nature and peculiarities of speech, based on inductive examination of languages of different type.

3 hrs., second half-year. M W F, 10.

199A–199B. Honor-course. The Staff.

Special problems by individual students, with credit of not less than 3 units.

3 hrs., throughout the year. M W, 11, and other hrs. to be arranged.

*Not to be given, 1917-18.

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FREE ELECTIVE COURSE

38. Ancient Egypt. Mr. GIFFORD.

Antiquities, customs, art, architecture, and culture of ancient Egypt.

1 hr., first half-year. M, 7 p.m.

GRADUATE COURSES

206A–206B. Anthropological Seminar. The Staff.

First half-year, religion; second half-year, social organization.

3 hrs., throughout the year. M, 7–9 p.m.

207A–207B. Special Work in Anthropology. The Staff.

Research work on special problems by individual students according to their qualifications and needs, with credit proportionate to the work done.

At least 2 hrs., throughout the year. M W, 11.

226A. Heredity and Civilization. Associate Professor KROEBER.

Heredity and non-hereditary agencies; biological and social factors; problems of capacity and achievement; the borderland between animal and man; the physiological and psychological basis of civilization; origins and development of institutions and knowledge.

3 hrs., first half-year. Hours to be arranged.

234A. Seminar in Mexican Archaeology.
Assistant Professor WATERMAN.

Investigation of problems connected with the ancient peoples of the Mexican Plateau.

2 hrs., first half-year. Th, 3–5.

234B. Seminar in Central American Archaeology.
Assistant Professor WATERMAN.

Special problems in connection with the Maya and related civilizations of Southern Mexico and Central America.

2 hrs., second half-year. Th, 3–5.

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ARCHITECTURE

*JOHN G. HOWARD, Fellow in the American Institute of Architects, Professor of Architecture and Director of the School of Architecture.

WILLIAM C. HAYS, B.S., Assistant Professor of Architecture.

WILLIAM E. LELAND, B.S., Lecturer in Architectural Mechanics.

WARREN C. PERRY, B.S., Instructor in Architecture.

M. EARL CUMMINGS, Instructor in Modeling.

VALERE DE MARI, Instructor in Water-coloring and Pen and Ink Drawing.

Honor-students in the Upper Division.—The student must have received honorable mention with the junior certificate, or, in case of seniors, have completed the junior work in architectural design with distinction.

1. Candidates for honors must be registered in the architectural curriculum as laid down in the Circular of Information.
2. At the beginning of each half-year each candidate will be required to submit his study-list to the head of the department for approval, and thereafter work in close touch with the various instructors, attending such conferences and making such reports as may be asked for.
3. Under the "value" system, as defined in the Circular of Information, honor-students will be encouraged to proceed to the more advanced work in design as they show fitness for it.
4. Honors in architecture require distinguished excellence in design and thoroughly satisfactory work in construction.

LOWER DIVISION COURSES

‡†5A–5B. History of Ancient and Classic Architecture.
Professor HOWARD.

A general survey of the history of ancient and classic architecture, with an analytical study of its character, illustrated by lantern slides. Open to all students especially interested in architecture and as a free elective to upper division students.

1 hr., throughout the year. Tu, 2.

*Absent on leave, 1917-18.

‡Courses 5A–5B, 5C–5D, 5E–5F will not be given in 1917-18; in their place students will take Philosophy 36, Greek 46 or 49, or any other course which has the approval of the department of architecture.

† The full course in History of Architecture and Allied Arts (5A–5B, 5C–5D, 5E–5F) is covered in three years, the courses being given in succession, one each year.

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‡†5C–5D. History of Mediaeval and Renaissance Architecture.
Professor HOWARD.

The architecture of the Middle Ages and the Renaissance period illustrated by lantern slides. Open to all students specially interested in architecture and as a free elective to upper division students.

1 hr., throughout the year. Tu, 2.

‡†5E–5F. History of Modern Architecture and Allied Arts.
Professor HOWARD.

A detailed study of modern architecture and allied arts, illustrated with lantern slides. Open to all students especially interested in architecture and as a free elective to upper division students.

1 hr., throughout the year. Tu, 2.

11. The Classic Orders of Architecture.

9 hrs., second half-year; 3 units. Prerequisite: Drawing 3A, 3B, 3C.

12A–12B. Water Color. Mr. DE MARI.

Architectural rendering in water color.

3 hrs., throughout the year; 1 unit each half-year; elementary, M, 1–4; advanced work, Th, 8–11. Prerequisite: Graphic Art 14A–14B.

13A–13B. Pen and Ink. Mr. DE MARI.

Architectural subjects rendered in pen and ink.

3 hrs., throughout the year; 1 unit each half-year. Elementary, F, 1–4; advanced, Th, 1–4. Prerequisite: Graphic Art 14A–14B.

14A–14B. Modeling. Mr. CUMMINGS.

Modeling of architectural ornament.

3 hrs., throughout the year; 1 unit each half-year. Two sections: I, Tu, 8–11; II, F, 8–11.

NOTE.—Courses 12A–12B, 13A–13B, 14A–14B may be continued and additional credit received.

UPPER DIVISION COURSES

101A–101B. Elements of Architectures.

Elementary architectural design. Course 106A–106B must be taken concurrently.

9 hrs., throughout the year; 3 units each half-year. Prerequisite: Drawing 3A, 3B, 3C, and junior standing.

‡Courses 5A–5B, 5C–5D, 5E–5F will not be given in 1917–18; in their place students will take Philosophy 36, Greek 46 or 49, or any other course which has the approval of the department of architecture.

† The full course in History of Architecture and Allied Arts (5A–5B, 5C–5D, 5E–5F) is covered in three years, the courses being given in succession, one each year.

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102A–102B. Planning. Mr. PERRY.

Fundamental problems in planning. Course 106C–106D must be taken concurrently.

12 hrs., first half-year, 4 units; 15 hrs., second half-year, 5 units. Prerequisite: courses 11, 101A–101B.

105A–105B. Historical Drawings in Ancient and Classic Architecture. Assistant Professor HAYS and Mr. PERRY.

3 hrs., throughout the year; 1 unit each half-year. Course 101 or 102 must accompany this course.

*105C–105D. Historical Drawings in Conjunction with Course 5C–5D. Professor HOWARD and Mr. PERRY.

3 hrs., throughout the year; 1 unit each half-year. Course 101 or 102 must accompany this course.

*105E–105F. Historical Drawings in Conjunction with Course 5E–5F. Professor HOWARD and Mr. PERRY.

3 hrs., throughout the year; 1 unit each half year. Course 101 or 102 must accompany this course.

106A–106B. Theory of Architecture. Mr. PERRY.

Pro-seminar, prescribed for students in course 101A–101B.

1 hr., throughout the year. W, 3.

106C–106D. Theory of Architecture. Mr. PERRY.

Continuation of course 106A–106B. Pro-seminar, prescribed for students in course 102A–102B.

1 hr., throughout the year. Th, 5.

108A–108B. Architectural Mechanics. Mr. LELAND.

Mechanical and electrical installation and equipment in relation to architecture. (*a*) Heating and ventilating; (*b*) power, lighting, elevators, vacuum cleaning, automatic sprinklers, etc.

2 hrs., throughout the year. M W, 8.

110. Housing. Assistant Professor HAYS.

Lectures on the house—isolated and collective: its historic and aesthetic development; its elements and their arrangements; its equipment.

1 hr., second half-year. Th, 2.

*Not to be given, 1917-18.

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GRADUATE COURSES

203A–203B. Planning and Composition. Assistant Professor HAYS.

Problems in planning and composition.

24 hrs., throughout the year; 8 units each half-year. Conference hours, Tu Th, 3–4:30. Prerequisite: course 102A–102B.

204. Advanced Design. Assistant Professor HAYS.

Advanced problems in planning and composition.

45 hrs., first half-year; 15 units. Prerequisite: course 203A–203B.

206E–206F. Theory of Architecture. Assistant Professor HAYS.

Continuation of course 106C–106D. Seminar prescribed to students in course 203A–203B.

1 hr., throughout the year. Th, 5.

207A–207B. Research and Master's Thesis. Assistant Professor HAYS.

Hours to be arranged. Course 203A–203B must be taken concurrently.

1 unit, first half-year; 4 units, second half-year. Prerequisite: graduate standing and course 102A–102B.

209A–209B. Professional Practice and Business Relations. Assistant Professor HAYS.

Seminar in office practice, working drawings, specifications, and ethics.

1 hr., seminar, 6 hrs. drafting, first half-year; 3 units; 2 hrs., seminar, second half-year; 2 units. Prerequisite: course 102A–102B or 101A–101B and graduate standing.

216. Graduate Thesis and Seminar. Assistant Professor HAYS.

A course to be arranged individually with students looking toward a degree in architecture. Prerequisite: course 204.

COURSES IN OTHER DEPARTMENTS

Strength of Materials. [See Civil Engineering 118A–118B.]

The Materials of Engineering Construction. [See Civil Engineering 8.]

Framed Structures. [See Civil Engineering 107E–107F, 117.]

Sewage Disposal and Water Supply. [See Civil Engineering 127.]

Graphostatics. [See Drawing 105.]

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ASTRONOMY

ARMIN O. LEUSCHNER, Ph.D., Sc.D., Professor of Astronomy and Director of the Students' Observatory.

RUSSELL T. CRAWFORD, Ph.D., Associate Professor of Practical Astronomy.

STURLA EINARSSON, Ph.D., Instructor in Practical Astronomy.

FERDINAND J. NEUBAUER, Ph.D., Instructor in Astronomy.

WALLACE CAMPBELL, A.B., Teaching Fellow in Astronomy.

As part of the lower division courses special lectures are offered by the Director and Astronomers of the Lick Observatory.

Every graduate course may be taken as a seminar course by arrangement with the instructor.

Honor-students in the Upper Division.—The following courses are prerequisite to honor-work in the upper division: Mathematics, either 5, 8 and 9, or 3 and 4; Physics 1A–1B. In addition to these, Chemistry 1C and Geology 1A are recommended. A student in the honor-group may be recommended for honors in astronomy at graduation:

1. Upon presenting a satisfactory written report (review or criticism) of some astronomical work (theoretical or practical), an account of which has been printed in some standard astronomical periodical or other publication, or

2. Upon presenting a complete and satisfactory computation in orbit theory or eclipses, or

3. Upon presenting a completed report of some advanced practical work done by the student.

Candidates for honors must prepare a programme at the beginning of their candidacy in consultation with the member of the department designated to supervise their work. On approval of this plan of study, the student will proceed to its completion, attending conferences and making such reports of progress as may be requested.

Honor-students will be allowed much freedom in their studies. To justify this, the work which they do must be consistently of high quality. The department will recommend the exclusion from the honor-group of all students who do not maintain each half-year an average of at least sixty per cent of first and second grades in all their courses and who do not complete their courses in astronomy with high credit. Candidates must fulfill the requirements for a major in astronomy and must enroll for Astronomy 206. (Although this course is listed as a graduate course it may be taken by advanced undergraduates.) A reading knowledge of French and German is required.

An observatory fee of $2.50 per half-year is charged in courses 2A–2E, 104A–104B, 105, 114.

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LOWER DIVISION COURSES

1–2. Elementary Astronomy.
Associate Professor CRAWFORD, Dr. NEUBAUER, and Mr. CAMPBELL.

A combination of courses 1 and 2A.
5 hrs., either half-year. The lectures and section work are taken as course 1; the observatory work is taken as course 2A.

1. Elements of Astronomy. Associate Professor CRAWFORD.

An introductory course. General facts and principles underlying the science of astronomy in all its branches.

3 hrs., either half-year. First half-year, lectures, M W F, 10. Second half-year, lectures, Sec. I, M W F, 10; II, Tu Th S, 9. The classes will be divided into smaller sections in which recitations, examinations, and conferences will be conducted. In the second half-year a separate section, III, 2 hrs., will be conducted by Professor Leuschner for students who have the equivalent of the entrance requirements in mathematics and physics for the colleges of engineering.

2A–2E. Practice in Observing. Dr. NEUBAUER and Mr. CAMPBELL.

These courses are supplementary to course 1 or 11 or 103A–103B, and are open to students who are taking or have taken any of these courses. The students may enroll for from 1 to 3 units by electing one or more of the divisions specified below.

All sections meet for organization on the first Thursday of the term at 7 p.m.

2A. Practical work at the observatory for beginners, with special emphasis on the elementary methods of determining time, latitude, and longitude. Constellation study. Descriptive observations of celestial objects.

3 hrs., either half-year; 1 unit.

2B. Practical work at the observatory for beginners, with special emphasis on astrophysical and photographic observations.

3 hrs., either half-year; 1 unit. Prerequisite: course 2A.

2C. Continuation of course 2A.

3 hrs., either half-year; 1 unit. Prerequisite: course 2A.

2E. The subject matter of courses 2A and 2C.

6 hrs., either half-year; 2 units.

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UPPER DIVISION COURSES

Free Elective Courses

5. History of Astronomy. Associate Professor Crawford.
3 hrs., first half-year. M W F, 2. Prerequisite: course 1.

11. Modern Astronomy. Dr. Einarsson.

The stars and nebulae. Progress in astronomy through modern methods, especially spectroscopic and photographic.

3 hrs., second half-year. M W F, 10. Prerequisite: course 1. For observatory work supplementary to this course students may elect course 2B.

Major Courses

103A–103B. General Astronomy. Dr. Einarsson.

The general facts and principles underlying the science of astronomy in all its branches, developed and discussed in detail.

3 hrs., throughout the year. M W F, 9. Prerequisite: Mathematics 5 and Physics 1A–1B. For observatory work in connection with this course students may elect one or more subdivisions of course 2 or 104A–104B, subject to the prerequisites announced.

104A–104B. Practical Astronomy. Professor Leuschner.

Lectures and observatory work. Practical work at the observatory with sextant, clock, chronograph, transit-and-zenith telescope, equatorial telescope, photographic telescope, reflector, altazimuth instrument. Computing.

5 hrs., throughout the year; 3 units. Lectures and recitations, Tu Th, 9; observatory work, Tu, 7–10 p.m. Prerequisite: Mathematics 5, Physics 1A–1B, and either course 1 or 103A. The course should also be preceded by a course in differential calculus.

105. Nautical Astronomy. Dr. Neubauer.

Astronomy as applied to navigation. Use of sextant, chronometer, nautical almanac, nautical tables. Determination of time, latitude, longitude on shipboard. Sailings. Great circle sailing. Lectures, computing, and practice work.

5 hrs., first half-year; 3 units. Hours to be arranged with instructor. Prerequisite: course 1 or 103A; Mathematics C.

107. Method of Least Squares—Adjustment of Observations. Dr. Einarsson.

The fundamental principles and processes of the method of least squares and their application to the solution of astronomical, physical, and engineering problems.

6 hrs., first half-year; 2 units. M W, recitation or lecture, 1–2, or practical applications, 1–4. Prerequisite: working knowledge of differential and integral calculus.

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108. Interpolation, Use of Tables, and Mechanical Quadratures.
Dr. EINARSSON.

The more useful formulae of interpolation, and their application in the use of astronomical and other tables. Development of the formulae of numerical differentiation and integration and their application in the construction of tables. Practice in extensive numerical computations, with special aim at rapidity and exactness.

3 hrs., first half-year, to be arranged. Prerequisite: working knowledge of differential and integral calculus.

*110. The Theory of Astronomical Refraction.
Associate Professor CRAWFORD.

2 hrs., first half-year, to be arranged. Prerequisite: course 104A or 114.

*112. Eclipses. Associate Professor CRAWFORD.

3 hrs., either half-year, to be arranged. Prerequisite: course 104A or 114.

116. Measurement and Reduction of Astronomical Photographs; Spectrograms. Dr. EINARSSON.

3 hrs., second half-year, to be arranged.

COURSES PRIMARILY FOR ENGINEERS

3. Surveyors' Course in the Elements of Spherical Trigonometry and Astronomy. Dr. EINARSSON and Dr. NEUBAUER.

The principles of spherical trigonometry and astronomy adapted to the needs of students in the colleges of engineering. Computing.

3 hrs., second half-year; 1 unit. Four sections: I, M, 1–4; II, Tu, 1–4; III, W, 1–4; IV, Th, 1–4. Prerequisite: Civil Engineering 1A. Civil Engineering 1B to be taken concurrently.

114. Practical Astronomy. Dr. EINARSSON.

The subject matter of course 104 more briefly presented, and adapted to the needs of students of civil engineering.

5–7 hrs., first half-year; 3 units. Lectures, Tu Th, 9, and one observatory period. The observatory is open for this course two evenings and one afternoon. The arrangement of the work depends so largely upon weather conditions that the student should reserve for this course several observatory periods. Prerequisite for students in the College of Civil Engineering: Astronomy 3 and Civil Engineering 3.

* Offered in alternate years. Either course 110 or 112 will be given, 1917–18.

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GRADUATE COURSES

206. Theoretical Astronomy. Professor LEUSCHNER.

3 hrs., first half-year. M W F, 10. Prerequisite: course 1 or 103A; Mathematics 4 or 109A–109B; ordinarily also Physics 105A. Open to advanced undergraduates.

207. Theoretical Astronomy. Professor LEUSCHNER.

The relative accuracy of the various methods of determining preliminary orbits.

3 hrs., second half-year. M W F, 10. Prerequisite: course 206.

†208A–208B. Introduction to Celestial Mechanics. Professor LEUSCHNER.

3 hrs., throughout the year. M W F, 9.

†209. Special Perturbations. Associate Professor CRAWFORD.

3 hrs., first half-year, to be arranged with instructor.

†210A–210B. The General Perturbations of the Minor Planets after Hansen, Newcomb, and Hill. Associate Professor CRAWFORD.

Hours to be arranged.

†212A–212B. Satellite Theory and Introduction to the Lunar Theory. Associate Professor CRAWFORD.

Hours to be arranged. Prerequisite: course 206.

†213. Selected Topics in Celestial Mechanics. Professor LEUSCHNER.

Either half-year. Hours and credit to be arranged with the instructor.

214. Advanced Practical Astronomy. Dr. EINARSSON.

5 hrs., either half-year; 3 units. M W, 11; M, 7–10 p.m. Prerequisite: course 104A–104B.

215. Advanced Study and Research. The STAFF.

Critical discussion and review of current astronomical publications. Investigation of special problems to be selected according to the preparation and the needs of individual students.

1 hr., either half-year, to be arranged.

†218. Mathematical Theories in Higher Geodesy. Associate Professor CRAWFORD.

†219. Physical Theories in Higher Geodesy. Associate Professor CRAWFORD.

† These courses form a series which the student can complete in about three years. From two to three of these courses are offered every half-year, the selection being based on the needs and the preparation of the graduate students in astronomy.

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COURSES IN OTHER DEPARTMENTS

Dynamics of Rotation. [See Physics 215.]	Professor SLATE.
Precession and Nutation. [See Physics 215A.]	Professor SLATE.
Spectroscopy. [See Physics 211–211C.]	Professor LEWIS.
Railroad Surveying. [See Civil Engineering 102]	Professor FOOTE.
Higher Surveying and Geodesy. [See Civil Engineering 105.]	Professor FOOTE.

LICK OBSERVATORY

The Lick Observatory at Mount Hamilton forms a separate department of the University. The unrivaled facilities for advanced astronomical work which are offered by its fine equipment, in this favorable location, are too well known to require description here. The department is open to graduate students under regulations prescribed by the Regents. The degrees of Master of Arts and Doctor of Philosophy are offered to students who have fulfilled the required conditions. (See Announcement of the Graduate Division.) For information relating to graduate work at the Observatory intending students should address the Recorder of the Faculties at Berkeley, or the Director of the Lick Observatory, at Mount Hamilton, Santa Clara County, California.

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BIOCHEMISTRY AND PHARMACOLOGY

T. Brailsford Robertson, Ph.D., Sc.D., Professor of Biochemistry.
Hardolph Wasteneys, Ph.D., Associate Professor of Pharmacology.
[2]Charles B. Bennett, Ph.D., Instructor in Biochemistry.
Edward S. Sundstroem, M.D., Instructor in Biochemistry.
John A. Marshall, M.S., D.D.S., Assistant in Pharmacology.
Louis A. Ray, Senior Technician in Biochemistry.

For science and general students the prerequisites for the study of biochemistry are as follows: matriculation physics and chemistry, Chemistry 1A–1B, 8A–8B and 9. No zoology, botany, histology, anatomy or physiology is required, but a student who has a sufficient knowledge of any of these subjects may be permitted to enter the course without having completely satisfied the preliminary requirements in chemistry outlined above. For science and general students the following series of courses is offered: 101, 102, 110, 111, 210, 211. These courses may be taken in any order or separately, provided the student has, in the opinion of the instructor, sufficient knowledge of related subject matter to enable him to carry on the work intelligently. Students taking courses 102 or 211 will be required to produce evidence of some preliminary training in physiology in addition to the requirements in chemistry outlined above.

For the medical student the prerequisites are as prescribed for the Medical School. Courses 101 and 102 are required.

The attention of intending graduate students in biochemistry is called to the fact that modern developments in this field of investigation call increasingly for a knowledge of the fundamental principles of physical chemistry, differential and integral calculus and statistical methods.

The equipment of the department affords ample opportunities for research. Facilities are offered to any properly qualified student who desires to undertake a well-planned investigation in any field of biochemistry.

The joint library of the department of biochemistry and physiology contains complete sets of all the important biochemical, pharmacological and physiological journals and the more important monographs on biochemical and related subjects.

UPPER DIVISION COURSES

101M. Biochemistry.
Professor Robertson, Dr. Bennett, and Dr. Sundstroem.

Chemistry of the constituents of living matter; chemical dynamics of life phenomena; chemical physiology of the blood, digestion, metabolism, reproduction, growth, and excretion.

17 hrs., second half-year; 9 units. Lectures, M Tu W Th, 1; F, 10; laboratory, M Tu W Th, 2–5. Open only to students matriculated in the Medical School.

[2] In residence second half-year only, 1917–18.

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101A. The same as course 101M except that laboratory work may be adjusted to meet special needs of academic students; open to academic students; will not be credited as part of the medical curriculum.

102M. Pharmacology.
Associate Professor WASTENEYS and Dr. MARSHALL.

The physiological action of drugs with illustrations derived from their therapeutic application; experiments and demonstrations.

The lectures will be delivered at the University of California Hospital in San Francisco; the laboratory work will be given in the Rudolph Spreckels Physiological Laboratory in Berkeley.

6 hrs., second half-year; 3 units. Lectures, M W, 3; laboratory, F, 1–5. Open only to students matriculated in the Medical School.

102A. The same as course 102M except that an equivalent amount of special reading, preparation of bibliographies, reports on special subjects, etc., may be substituted for the lectures in cases approved by the professor. Open to academic students with the necessary preparation; will not be credited as part of the medical curriculum.

110. Advanced Chemical Biology. Professor ROBERTSON.

Special topics may be selected by the student in conference with the instructor as subjects of advanced and intensive study. Credit, not exceeding 4 units each half-year, to be arranged.

111. Problems in Metabolism. Dr. SUNDSTROEM.

8 hrs., first half-year; 4 units. Lectures, M W, 1; laboratory, M W, 2–5.

GRADUATE COURSES

210. Research in Biochemistry. Professor ROBERTSON.

Either half-year, hours to be arranged.

211. Research in Pharmacology. Associate Professor WASTENEYS.

Either half-year, hours to be arranged.

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BOTANY

WILLIAM A. SETCHELL, Ph.D., Professor of Botany.

WILLIS L. JEPSON, Ph.D., Associate Professor of Dendrology.

HARVEY M. HALL, Ph.D., Associate Professor of Economic Botany and Assistant Botanist in the Agricultural Experiment Station.

[2]NATHANIEL L. GARDNER, Ph.D., Assistant Professor of Botany.

THOMAS H. GOODSPEED, Ph.D., Assistant Professor of Botany.

TOWNSHEND S. BRANDEGEE, Ph.B., Honorary Curator in the Herbarium.

C. A. PURPUS, Pharm.D., Botanical Collector.

EUGENE S. HEATH, M.A., Assistant in Botany, for the first half-year.

Courses 2 and 3 lead directly to and are prerequisite for advanced work in botany. Lecture courses in the summer session may be equivalent to course 1A–1B in part, and credit will not be given for both in such a case. Courses 2 and 3 are also designed to fulfill lower division requirements in the College of Agriculture. Laboratory courses in the summer session may be equivalent to courses 2 and 3; credit will not be given for duplicated work.

Courses 104A–104B, 105A, 109A–109B, and 116 are required for major subjects in different divisions of the department of agriculture.

Honor-students in the Upper Division.—Of the 24 units of upper division work required for graduation with honors, 18 units should consist of courses 104, 105, 109, the remaining 6 units to be made up preferably from one of the more advanced courses in the department. In special cases, by permision of the head of the department, these 6 units may be taken in some allied department.

Honor-students will be given special opportunities as far as facilities will permit. These may consist of additional working room in the laboratories, of opportunities for herbarium, garden, or field work, or of additional individual attention and guidance from the instructor. If it seems advisable, an honor-student may, after consultation with the instructor, substitute special field, laboratory, or garden studies for a part of the class work regularly required of other students.

For those students who expect to prepare for botanical research or teaching, a broad foundation in related subjects is strongly advised. The fundamental courses in physics and chemistry should be taken, if possible, before the work in botany is begun. Courses in physiology, zoology, and plant pathology may be included to advantage; higher mathematics is desirable; a reading knowledge of French and German is necessary; some knowledge of Latin is very desirable for advanced systematic botany.

A laboratory fee of $2.50 will be charged each half-year for each laboratory course. This rule applies to courses 2, 3, 104A–104B, 105A–105B, 106A–106B, 107A–107B, 109A–109B, 110, 111A–111B, 112A–112B, 113A–113B, 116.

[2]In residence second half-year only, 1917-18.

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LOWER DIVISION COURSES

1A–1B. Fundamentals of Botany. Professor SETCHELL.

Lectures, illustrated as far as possible by means of specimens, diagrams, and preparations; designed to set forth in a general way the most important facts, problems, and theories with which botanical science is concerned.

3 hrs., throughout the year. M W F, 8. Either 1A or 1B may be taken separately without prerequisite.

2. General Botany. Mr. HEATH and Assistants.

An elementary laboratory study of the plant, including its general structure and the correlation and individual functions of the various plant organs.

6 hrs., first half-year; 3 units. Lectures, M W, 8. Laboratory, five sections: I, M W, 1–3; II, Tu Th, 8–10; III, Tu Th, 10–12; IV, Tu Th, 1–3; V, Tu Th, 3–5. Prescribed for students in the College of Agriculture and prerequisite to all upper division courses in botany.

3. General Botany (continued). Assistant Professor GARDNER and Assistants.

A continuation of course 2 with special emphasis upon the general characteristics, comparative morphology, and economic importance of representative orders of both spore-bearing and seed-bearing plants.

6 hrs., second half-year; 3 units. Lectures, M W, 8. Laboratory, five sections as in course 2. Prerequisite: course 2. Prescribed for students in the College of Agriculture and prerequisite to all upper division courses in botany.

UPPER DIVISION COURSES

104A–104B. General Phaenogamic Botany. Associate Professor JEPSON.

104A. Forest Botany. Laboratory work on the botanical characters of forest trees and chaparral; practice in the determination of important California species; lectures on the classification of Gymnosperms and other groups, and on the essentials of morphology and physiology as applied to trees.

6 hrs., first half-year; 3 units. Tu Th, 1–4. Field work on alternate Saturdays. Prerequisite: courses 2 and 3.

104B. Angiosperms. Representative orders of flowering plants, dealing especially with their habits and growth, structure, classification, and geographical distribution. Laboratory work and lectures.

6 hrs., second half-year; 3 units. Tu Th, 1–4, with 3 hrs. field work to be arranged. Prerequisite: course 104A.

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105A–105B. General Cryptogamic Botany.
Professor SETCHELL and Mr. ——.

The orders of spore-bearing plants from the points of view of structure, development, and economic importance. Laboratory work and informal lectures.

6 hrs., laboratory, 1 hr. lecture, throughout the year; 3 units each half-year. M F, 1–4. Prerequisite: courses 2 and 3. May be taken either half-year by properly qualified students.

106A–106B. Phycology and Mycology. Professor SETCHELL.

Laboratory work upon the structure, development, and classification of the algae, fungi, and lichens, with informal lectures and the assignment of outside reading. Intended for students who desire some critical knowledge of the lower cryptogamous orders.

6 hrs., throughout the year; 3 units each half-year. M W F, 10–12. Prerequisite: course 105A–105B.

107A–107B. Pteridology and Bryology. Professor SETCHELL.

The structure, development, and classification of the higher cryptogams (hepatics, mosses, ferns, and fern allies) will be treated in the same way as the lower cryptogams in course 106A–106B.

6 hrs., throughout the year; 3 units each half-year. M W F, 10–12. Prerequisite: course 105A–105B.

109A–109B. Physiological Plant Histology.
Assistant Professor GOODSPEED.

A physiological study of the activities of the principal tissue systems of the plant body based upon an examination of their structure.

6 hrs., throughout the year; 3 units each half-year. Tu Th, 9–12. Prerequisite: courses 2 and 3.

110. Botanical Microtechnique. Assistant Professor GOODSPEED.

Laboratory practice in the methods of preparing plant material for microscopical examination. Preservation of tissues, fixation, staining, the paraffin method, the celloidin method and the freezing method. Assigned readings and written reports.

6 hrs., second half-year; 2 units. M W, 9–12. Prerequisite: courses 2 and 3.

111A–111B. Vegetable Cytology. Assistant Professor GOODSPEED.

The anatomy and physiology of the cell, including the cell division, chromosome reduction, fertilization, and a consideration of heredity and development from the standpoint of cytology. Laboratory work and lectures.

6 hrs., throughout the year; 3 units each half-year. M W, 9–12. Prerequisite: courses 2 and 3, 109A–109B and 110.

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112A–112B. Special Taxonomic Studies. Associate Professor JEPSON.

Studies in special morphology of the compositae, leguminosae, pinaceae, or some similar group, mainly from the taxonomic standpoint, followed by the critical examination of various west American genera. At least part of the summer in the year previous to the election of this course should be spent in field work, preferably in California.

6 hrs., throughout the year; 3 units each half-year. Tu Th, 9–12; field work, alt. S, 8–5. Prerequisite: course 104A–104B.

113A–113B. Taxonomy and Phylogeny of the Phaenogams. Associate Professor JEPSON.

Characters and affinities of the classes and more important orders of seed plants, accompanied by informal discussions of phylogenetic problems.

6 hrs., throughout the year; 3 units each half-year. M W, 9–12; field work to be arranged. Prerequisite: courses 104A–104B and 105A–105B.

116. Economic Botany. Associate Professor HALL and Assistants.

Laboratory work on the morphology, classification, geographical distribution, and properties of plants which furnish commercial products and agricultural crops; lectures on the origin, collection, uses, and commerce of plant products.

6 hrs., first half-year; 3 units. Lectures, M W, 8; laboratory, M W, 10–12. Prerequisite: courses 2 and 3; Chemistry 1A–1B.

GRADUATE COURSES.

The equipment of the botanical department is fairly complete, permitting a wide range of studies. It includes the following collections:

(1) A phaenogamic herbarium of 170,000 sheets of mounted specimens and a large quantity of unmounted material which is available for use by responsible investigators. The flora of Western America is here better represented than in any other collection, which permits of satisfactory work in preparing revisions or monographs of these plants. The economic section contains representatives of the more common cultivated plants, particularly of those grown in California.

(2) A cryptogamic herbarium consisting of 25.000 mounted sheets. The representation of the west coast algae is undoubtedly the most complete in existence. These collections, together with the ease with which the marine forms may be collected, render the study of cryptogams, and particularly of algae, very satisfactory.

(3) A botanical museum containing valuable sections of woods, barks, cones, etc., available for class and research work.

(4) A botanical garden where native plants are grown and where cultural experiments may be carried on by qualified students.

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225A–225B. Advanced Cryptogamic Botany. Professor SETCHELL.

Advanced and research work on the cryptogamic plants of California, particularly on the algae.

Throughout the year. M W, 10–12. Credit to be arranged.

226A–226B. Advanced Phaenogamic Botany. Associate Professor JEPSON.

Special problems requiring the original investigation of some particular order or smaller group of flowering plants; involves work in the field as well as in the laboratory.

Throughout the year. M W, 9–12. Credit to be arranged.

227A–227B. Advanced Plant Physiology. Assistant Professor GOODSPEED.

Special problems in plant physiology will be assigned to properly prepared students.

Throughout the year. M W, 9–12. Credit to be arranged.

228A–228B. Advanced Economic Botany. Associate Professor HALL.

Special problems involving the investigation of some group of plants yielding commercial or agricultural products.

9 hrs., throughout the year; 3 units each half-year. M W F, 1–4.

229A–229B. Advanced Plant Ecology. Associate Professor HALL.

Students properly prepared in plant physiology and taxonomy may undertake special problems in plant ecology.

Throughout the year; hours to be arranged.

230A–320B. Botanical Seminar. Professor SETCHELL and Staff.

Graduates and advanced undergraduates meet once a week for the discussion of special topics. The head of the department should be consulted.

1 hr., throughout the year. M, 7 p.m.

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CELTIC

WILLIAM W. LYMAN, JR., M.A., Instructor in Celtic and English.

LOWER DIVISION COURSE

1A–1B. Elementary Modern Irish. Mr. LYMAN.

Essentials of grammar; short stories and poems by contemporary writers.

3 hrs., throughout the year. M W F, 1.

UPPER DIVISION COURSES

101. Modern Irish: Advanced Course. Mr. LYMAN.

Prose romances of the eighteenth and nineteenth centuries.

2 hrs., first half-year, to be arranged.

102A–102B. Modern and Early Welsh. Mr. LYMAN.

This course is designed to give a student a reading knowledge of the language.

2 hrs., throughout the year, to be arranged.

Either course 1A–1B, or 102A–102B will be given, depending upon the needs and wishes of the students.

106. Old and Middle Irish. Mr. LYMAN.

The old forms of the Irish tongue together with the reading of several of their chief literary monuments.

2 hrs., second half-year, to be arranged. Open to qualified students without a previous knowledge of Celtic.

150A–150B. The Development of Irish Philology and Literature. Mr. LYMAN.

Special problems.

Throughout the year; hours to be arranged.

201. Seminar. Mr. LYMAN.

Intensive study of Old Irish documents with discussions of the relation of the language to comparative philology.

3 hrs., either half-year, to be arranged.

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CHEMISTRY

GILBERT N. LEWIS, Ph.D., Professor of Physical Chemistry and Dean of the College of Chemistry.

EDMOND O'NEILL, Ph.B., Professor of Inorganic Chemistry and Director of the Chemical Laboratory.

WALTER C. BLASDALE, Ph.D., Associate Professor of Chemistry.

WILLIAM C. BRAY, Ph.D., Associate Professor of Chemistry.

*HENRY C. BIDDLE, Ph.D., Assistant Professor of Chemistry.

EDWARD BOOTH, Ph.B., Assistant Professor of Chemistry.

JOEL H. HILDEBRAND, Ph.D., Associate Professor of Chemistry.

MERLE RANDALL, Ph.D., Assistant Professor of Chemistry.

CHARLES W. PORTER, Ph.D., Lecturer in Organic Chemistry.

GEORGE E. GIBSON, Ph.D., Instructor in Chemistry.

WILLIAM L. ARGO, Ph.D., Instructor in Chemistry.

GERALD E. K. BRANCH, Ph.D., Instructor in Chemistry.

ERMON D. EASTMAN, Ph.D., Instructor in Chemistry.

WORTH H. RODEBUSH, Ph.D., Instructor in Chemistry.

Two Teaching Fellows.

Fourteen Assistants.

Matriculation chemistry, subject 12*b*, is usually prerequisite to all courses in chemistry, excepting courses 1C and 1D. To students who have not taken chemistry in the high schools an opportunity of taking an equivalent course is offered during the summer session of the University.

Courses 1C and 1D are not open to students who have credit for matriculation chemistry, nor to those who have taken or are taking course 1A–1B.

Course 1A–1B is prerequisite to all further courses in chemistry. Students who plan to take advanced work in chemistry should have begun courses 6A–6B, 8A–8B, 9 and 110 before proceeding to further work in chemistry. A thorough training in mathematics and physics should not be neglected.

All undergraduate students from other institutions, who desire to take courses in chemistry more advanced than course 1A–1B, must present themselves to Professor Blasdale on or before the date of their registration for an informal examination or test of their fitness to undertake such work. In cases of doubt, such students will be required to enter a probation course of not more than two weeks' duration.

All students, whether in the College of Chemistry or in the College of Letters and Science, who propose to enter any branch of pure or applied chemistry as a profession are recommended to submit their proposed

* Absent on leave, 1917–18.

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schedules to Professor O'Neill, 221 Chemistry Building. Whether the student intends to prepare himself for research in governmental, industrial, or educational institutions, for teaching, for analytical chemistry, manufacturing chemistry, the chemistry of petroleum or any of the other branches of chemical engineering, it is desirable that a complete schedule of courses, chosen with a definite purpose and free from conflicts, be arranged at the earliest possible date. A general schedule for students in chemical engineering will be found in the announcement of the College of Chemistry in the Circular of Information.

A fee of $5 will be charged for each unit of laboratory work in undergraduate courses; for example, $10 for 1A–1B, 5, 6A–6B, and 9. The fee for course 180H is an exception to this rule and is $10 irrespective of the number of hours taken. In addition to the fee, a deposit of $5 must be made for each undergraduate course and this deposit, less the cost of apparatus destroyed, will be returned at the end of the half-year.

The chemical laboratories are well equipped for research work, and are open to properly qualified graduate students, not only during the college year, but also throughout the summer vacation.

Honor-students in the Upper Division.—Students in the College of Chemistry, and those in the College of Letters and Science who have a major in chemistry, are urged, when eligible, to enroll at the beginning of their junior year as candidates for honors. Honor-students will be given a larger share of personal instruction and a greater opportunity to choose courses, and work within courses, in a manner best suited to individual needs and aims. Students not in the honor-group will not, except under unusual circumstances and with the express permission of the instructor, be permitted to enroll for honor-courses (marked H) nor for undergraduate research. Students in the College of Letters and Science enrolled in the honor-group will not be recommended for honors in chemistry at graduation unless their work includes courses 6A–6B, 8A–8B, 9, 110, 114H and 180H. Students enrolled in the honor-group should confer with Professor Bray, Chairman of the Committee on Honors in Chemistry, regarding their whole plan for the last two years of college work.

LOWER DIVISION COURSES

1C. Elements of Chemistry. Professor O'Neill.

Lectures on the general principles of chemistry, with experimental illustration.

2 hrs., first half-year. Tu Th, 10.

1D. Elements of Chemistry. Professor O'Neill.

The principles of chemistry with special consideration of applications to the manufacturing industries. Lectures, fully illustrated by experiments.

2 hrs., second half-year. Tu Th, 8.

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1A–1B. General Inorganic Chemistry and Qualitative Analysis.

3 hrs., lectures and quiz, and 4 hrs. laboratory work, throughout the year; 5 units each half-year.

Lectures and quiz.

Associate Professor HILDEBRAND; Associate Professor BRAY, Assistant Professor BOOTH, Drs. GIBSON, ARGO, BRANCH, EASTMAN, and RODEBUSH.

Two sections: M W F, 9; M W F, 10.

Laboratory.

Assistant Professor BOOTH; Associate Professors BRAY and HILDEBRAND, Drs. GIBSON, ARGO, BRANCH, EASTMAN, and RODEBUSH.

Four sections: I, M F, 1–3; II, Tu Th, 9–11; III, Tu Th, 1–3; IV, W, 1–3; S, 9–11. Prerequisite: matriculation chemistry, subject 12*b*. In special cases students who have credit for matriculation physics may be allowed to take this course without the chemistry prerequisite, but in no case without the written consent of the instructor.

5. Quantitative Analysis—Gravimetric and Volumetric.

Associate Professor BLASDALE.

Short course in the principles and methods of quantitative analysis, designed for students who do not intend to take further work in chemistry.

7 hrs., either half-year; 3 units. Lecture, W, 1; laboratory, M F, 1–4.

6A–6B. Quantitative Analysis—Gravimetric and Volumetric.

Associate Professor BLASDALE and Dr. GIBSON.

Full course in the principles and methods of quantitative analysis.

7 hrs., throughout the year; 3 units each half-year. Two sections: Lecture, M, 10; laboratory, Tu Th, 1–4.

8A–8B. Elements of Organic Chemistry. Dr. PORTER.

An introductory study of the compounds of carbon. Recitations and lectures with experimental illustrations. Laboratory course 9 should, if possible, accompany this course.

2 hrs., throughout the year. Tu Th, 8. Fortnightly quiz, hour to be arranged, probably M or Tu, 4.

9. Elements of Organic Chemistry: Laboratory. Dr. PORTER.

A comparative experimental study of the physical properties and chemical reactions of the more commonly occurring classes of organic substances. Supplementary to course 8A–8B and open to all students enrolled in that course.

6 hrs., either half-year; 2 units. M W or W F or M F, 1–4.

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UPPER DIVISION COURSES

100. Organic Chemistry: Laboratory. Dr. PORTER and Dr. BRANCH.

Continuation of course 9. The preparation of organic compounds and the study of their properties, including methods of analysis.

6 hrs., second half-year; 2 units. M F, 1–4. Prerequisite: courses 8A–8B and 9.

101. Organic Chemistry: Laboratory. Dr. BRANCH.

Continuation of course 100.

6 hrs., first half-year; 2 units. M F, 1–4.

102A–102B. Advanced Organic Chemistry. Dr. BRANCH.

Lectures and discussions.

3 hrs., throughout the year. M W F, 9. Prerequisite: courses 8A–8B and 9.

110. Elementary Physical Chemistry. Associate Professor HILDEBRAND.

Required for all later work in physical chemistry and designed also to meet the needs of students in allied sciences.

3 hrs., second half-year. Tu Th, 11; W, 4. Prerequisite: course 5 or 6A; Physics 1A–1B or 2A–2B.

111, 111H. Physical Chemistry: Laboratory. Dr. RODEBUSH.

Physico-chemical problems and measurements. Prerequisite: course 110.

111.—10 hrs., first half-year; 4 units. Tu W Th, 1–4, and an additional hour.

111H.—9 hrs., first half-year; 3 units. Tu W Th, 1–4.

114H. Thermodynamics. Dr. GIBSON.

The principles of thermodynamics, with examples of their application to chemistry.

3 hrs., first half-year. M W F, 10. Prerequisite: courses 6A–6B, 110; Physics 1A–1B, 2C–2D or 2A–2B, 3A–3B; mathematics, familiarity with differential and integral calculus.

116H. Advanced Physical Chemistry and Electro-Chemistry. Dr. ARGO.

3 hrs., second half-year. M W F, 10. Prerequisite: courses 111H and 114H.

120, 120H. Advanced Inorganic Chemistry. Associate Professor BRAY.

Preparation and experimental study of substances, designed primarily to illustrate the factors which influence equilibrium and the speed of chemical reactions. Correlation of material by means of the periodic system.

7 hrs., second half-year; 3 units. Lecture, Tu or Th, 10; laboratory, Tu, 1–4, and one other three-hour period to be arranged. Prerequisite: course 6A–6B (5 only by special permission).

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121, 121H. Advanced Inorganic Chemistry. Associate Professor BRAY.

Continuation of course 120, including advanced qualitative analysis with some study of the rare elements.

7 hrs., first half-year; 3 units. Lecture, Tu or Th, 10; laboratory, Tu, 1–4, and one other three-hour period to be arranged. Prerequisite: course 120 or 120H.

122. Applications of the Phase Rule. Associate Professor BLASDALE.

The use of the Phase Rule in the treatment of a variety of chemical problems, especially those of practical interest.

2 hrs., first half-year. Tu Th, 11. Prerequisite: course 110.

124. Advanced Quantitative Analysis. Associate Professor BLASDALE.

The theory and use of special methods of quantitative analysis, including physico-chemical methods and electro-analysis.

6 hrs., first half-year; 2 units. Conference hour, W, 2; five laboratory hours, to be arranged.

126. Gas and Fuel Analysis. Assistant Professor BOOTH.

The principles and methods of accurate gas analysis.

4 hrs., first half-year; 2 units. Lecture, M, 1; laboratory, F, 1–4. Prerequisite: course 6A–6B.

140A. Chemical Technology. Professor O'NEILL.

General consideration of the processes employed in chemical manufacturing; installation of large scale apparatus, management, and costs.

2 hrs., first half-year. Tu Th, 8. Prerequisite: courses 6A–6B, 8A–8B, 9, 110, 111.

140B. Chemical Technology. Professor O'NEILL.

Continuation of course 140A, with special reference to the chemical technology of the Pacific Coast.

2 hrs., second half-year. Tu Th, 10. Prerequisite: courses 6A–6B, 8A–8B, 9, 110, 111.

141. Chemical Technology: Laboratory. Professor O'NEILL.

Laboratory work supplementary to courses 140A and 140B. Large scale preparation of commercial chemicals, with special reference to the petroleum industry. Experimental study of technical processes. Methods of technical analysis.

6 hrs., first half-year; 2 units. Tu F, 1–4. Prerequisite: same as for course 140A.

*143. Chemistry of the Silicate Industries. Assistant Professor BOOTH.

The chemistry and methods of investigation of ceramic materials, glass, cement, etc.

2 hrs., first half-year. Tu Th, 8. Prerequisite: course 122.

*Not to be given, 1917-18.

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145. Applied Electro-chemistry. Assistant Professor RANDALL.

A lecture and laboratory course dealing with certain fundamental electro-chemical processes, and with the chemical, physical, and economic factors involved in electro-chemical technology.

7 hrs., first half-year; 3 units. Lecture hr. to be arranged. Laboratory, M F, 1–4. Prerequisite: courses 110 and 111.

160. History of Chemistry. Professor O'NEILL.

The development of modern chemistry.

2 hrs., first half-year. Tu Th, 9. Prerequisite: courses 5, 8A–8B, 110.

179. Special Laboratory Work.

Students may be given an opportunity to carry on laboratory work along lines in which they are especially interested, and for which they are especially qualified. Such work can be undertaken under the direction of any member of the instructing staff who is willing to supervise it.

6 to 9 hrs., either half-year; 2 to 3 units. Hours to be arranged.

180H. Chemical Research.

Students who have completed with high credit a satisfactory number of advanced courses may prosecute original research representing not less than 4 units of experimental work under the direction of one of the members of the instructing staff. The explicit consent of the instructor must be obtained.

190H. Pro-seminar in Chemistry. The Staff.

See course 290.

199H. Special Reading Course. The Staff.

Reading and conference for individual honor-students. Credit to be arranged.

These pro-seminar courses will, in certain cases, be combined with the corresponding graduate seminars 290, etc. (See note under these courses.)

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GRADUATE COURSES

280. Graduate Research.

The laboratory is open at all times to graduate students who wish to prosecute original investigations. Such work will ordinarily be under the direction of some member of the instructing staff who will determine the credit value of the work.

290. Graduate Seminar in Chemistry. The Staff.

As a rule two seminars are offered in each half-year. The subjects will vary from year to year and will be announced at the beginning of each half-year. In certain cases courses 190H and 290 will be combined.

Research Conference.—Members of the instructing staff and students engaged in graduate research meet once a week to discuss the various investigations in progress in the laboratory. M or W, 11. No credit.

Chemical Colloquium.—In addition to the seminar courses, an evening colloquium will be held bi-weekly each half-year for the presentation and discussion of recent advances in chemistry and allied sciences. No credit.

COURSES IN OTHER DEPARTMENTS

Physiological Chemistry. [See under Biochemistry.]

Metallurgy and Assaying. [See under Mining and Metallurgy.]

Minerals and Blowpipe Analysis. [See under Geology and Mineralogy.]

Sanitary Chemistry and Water Analysis. [See under Civil Engineering.]

COURSES IN THE DEPARTMENT OF AGRICULTURE

Chemistry of Soils and Fertilizers. [See under Soils and Fertilizers.]

Chemistry of Milk. [See under Dairy Industry.]

Chemistry of Wine. [See under Viticulture.]

Analysis of Agricultural Products. [See under Agricultural Chemistry.]

Food Analysis. [See under Nutrition.]

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CIVIL ENGINEERING

CHARLES DERLETH, JR., C.E., Professor of Civil Engineering and Dean of the College of Civil Engineering.

CHARLES G. HYDE, B.S., Professor of Sanitary Engineering.

FRANCIS S. FOOTE, JR., E.M., Professor of Railroad Engineering.

ARTHUR C. ALVAREZ, B.S., Assistant Professor of Civil Engineering.

ADOLPHUS J. EDDY, B.S., Assistant Professor of Civil Engineering.

WILFRED F. LANGELIER, M.S., Assistant Professor of Sanitary Engineering.

CLEMENT T. WISKOCIL, C.E., Instructor in Civil Engineering.

EDWIN D. HAYWARD, B.S., Instructor in Civil Engineering.

VALDEMAR ARNTZEN, Expert Mechanic in Civil Engineering Laboratory.

J. R. SHIELDS, B.S., Engineer in Testing Laboratory.

H. H. HARDER, Assistant in Testing Laboratory.

Laboratory Fees.—$5 a half-year for courses 1A–1B, 1E, 102; $7.50 for 123 to 128; $10 for 108C, 108E, 108F; and $20 each for 3 and 103.

Honors.—Students will be recommended for honors on the basis of the quality of the work done in the regular curriculum of the senior year. Particular emphasis will be placed upon the thesis.

LOWER DIVISION COURSES

1A–1B. Plane Surveying.

Professor FOOTE, Assistant Professors ALVAREZ, EDDY, and LANGELIER, Mr. WISKOCIL, Mr. HAYWARD, and Assistants.

Methods of plane surveying; field practice; calculations, and mapping.

4 hrs., throughout the year; 3 units each half-year. Recitation sections: I, II, M F, 8; III, IV, M F, 9; V, VI, Tu Th, 8. Field and drafting sections: I, M, 1–3; II, Tu, 9–11; III, Tu, 1–3; IV, Th, 9–11; V, F, 1–3. Prescribed, freshman year, in the colleges of engineering. Prerequisite: plane trigonometry. Fee, $5 each half-year.

1E. Plane Surveying.

Professor FOOTE, Assistant Professors ALVAREZ, EDDY and LANGELIER, Mr. WISKOCIL, Mr. HAYWARD, and Assistants.

The more elementary parts of course 1A–1B briefly presented. Open only to students of agriculture and architecture.

4 hrs., either half-year; 3 units. Tu Th, 11; W or Th, 1–3. Fee, $5. Prerequisite: plane trigonometry.

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3. Summer Class in Plane Surveying.
Professor FOOTE, Assistant Professors ALVAREZ, EDDY, and LANGELIER, Mr. WISKOCIL, Mr. HAYWARD, and Assistants.

Four weeks; 3 units. Sec. I begins the day after Commencement; Sec. II, four weeks later. The summer school site is near Santa Cruz. Fee, $20. Prerequisite: course 1A–1B.

8. The Materials of Engineering Construction.
Assistant Professor ALVAREZ, Mr. WISKOCIL and Mr. HAYWARD.

The structural properties and adaptability of various materials employed in engineering construction.

2 hrs., second half-year. Sec. I, M F, 8; II, M F, 9; III, Tu Th, 8. Prerequisite: sophomore standing.

25. Plumbing, Heating, Ventilating, and Lighting.
Assistant Professor LANGELIER.

For students of public health and sanitary engineering.

2 hrs., first half-year. Tu Th, 9. Prerequisite: Physics 1A–1B, Chemistry 1A–1B, Hygiene 1, or equivalents.

UPPER DIVISION COURSES

102. Railroad Surveying. Professor FOOTE and Mr. HAYWARD.
Simple, compound, and transition curves; reconnaissance, preliminary and location surveys; calculations of earthwork and other quantities; field work, such as running in curves, etc.

5 hrs., first half-year; 3 units. Lectures, Tu Th, 10; field work, Th, 1–4. Prerequisite: course 3. Fee, $5.

102C. Railroad Engineering Office Practice. Professor FOOTE.
The plotting of railroad maps and profiles; calculation of volumes of masonry and earthwork; drafting of railroad structures.

3 hrs., second half-year; 1 unit. Tu, 1–4. Prerequisite: course 102.

103. Summer Class in Railroad Surveying.
Professor FOOTE, Assistant Professors ALVAREZ, EDDY, and LANGELIER, Mr. WISKOCIL and Mr. HAYWARD.

Four weeks; 3 units. Begins the day after Commencement. Fee, $20. Prerequisite: courses 3 and 102.

104A. Economics of Railroad Location. Professor FOOTE.
Influence of railroad location upon profit-producing value, with particular reference to the effect of distance, curvature, and grades upon operating expenses.

3 hrs., first half-year. M W F, 10. Prerequisite: course 103.

104B. Railroad Construction and Maintenance. Professor FOOTE.
Grading, tunneling, waterways, track laying; the materials and methods used in maintenance work; signaling and interlocking; yards and terminals.

3 hrs., second half-year. M W F, 10. Prerequisite: course 103.

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105. Higher Surveying and Geodesy. Professor FOOTE.

Methods of geodetic surveying; adjustment of observations; geodetic positions; map projections.

2 hrs., second half-year. Tu Th, 11. Prerequisite: course 3; Astronomy 3 and 107.

106. Highway Engineering. Professor HYDE.

The location, design, construction and maintenance of roads and streets; the construction and maintenance of pavements.

2 hrs., first half-year. Tu Th, 11. Prerequisite: course 8.

107A. Framed Structures. Assistant Professor EDDY.

The computation of stresses in roofs, building frames, and simple bridge trusses, chiefly by analytical methods.

5 hrs., second half-year; 3 units. W F, 8; Th, 1–4. Open to students in civil engineering who have taken, or who are taking course 108A–108B, section I, Mechanics 102A–102B or Physics 105A–105B, and Drawing 105.

107C–107D. Framed Structures. Professor DERLETH.

Continuation of course 107A. Stress computations for steel-framed structures; the design of plate girders, roof, and bridge trusses; bridge shop practice.

5 hrs., throughout the year; 3 units each half-year. Tu Th, 10; W, 1–4. Prerequisite: courses 107A and 108A–108B, Sec. I.

107E–107F. Framed Structures. Assistant Professor EDDY.

For architectural students. Stress computations and design of structures in wood, steel, and reinforced concrete, particularly of buildings; foundations and retaining walls; structural specifications.

5 hrs., throughout the year; 3 units each half-year. Tu Th, 8; M, 1–4. Prerequisite: courses 117 and 118A–118B.

108A–108B. Strength of Materials.
Professor DERLETH, Assistant Professors ALVAREZ and EDDY.

The elastic and ultimate resistance of materials; stress analysis for bars, beams, columns and shafts; theory of resilience; deflections and combined stresses; elements of design for wood, steel, and reinforced concrete structures.

This course is given in three sections. Prerequisite: Mathematics 4A–4B. Physics 105A–105B or Mechanics 102A–102B must be taken concurrently.

Sec. I, Professor DERLETH; 3 hrs., first half-year, M W F, 9; and 2 hrs., second half-year; Tu Th, 9. For civil engineering students.

Sec. II, Assistant Professor ALVAREZ; 3 hrs., first half-year, M W F, 10; and 2 hrs., second half-year, M F, 10. For mechanical and electrical engineering students.

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Sec. III, Assistant Professor EDDY; 3 hrs., first half-year, M W F, 10; and 2 hrs., second half-year, M F, 10. For mechanical and electrical engineering students.

NOTE.—Mining (petroleum engineering) and chemical engineering students may enroll in any section of course 108A. Mining and metallurgy students in the College of Mining are required to take course 118B.

108C. Civil Engineering Laboratory.
Assistant Professor ALVAREZ, Mr. WISKOCIL and Mr. SHIELDS.

Physical tests of timber, metals, brick, plain and reinforced concrete, macadam and asphaltic road materials.

6 hrs., first half-year; 2 units. Laboratory periods, Sec. I, M, 1–4; II, W, 1–4; III, F, 1–4. Computing periods to be arranged. Prerequisite: courses 8 and 108A–108B. Students in sanitary engineering and in irrigation may take part of the complete course, credit, 1 unit. Fee, $10 for 2 units, $5 for 1 unit.

108E. Civil Engineering Laboratory.
Assistant Professor ALVAREZ, Mr. WISKOCIL and Mr. SHIELDS.

Physical tests of cement, mortars, plain and reinforced concrete.

3 hrs., second half-year; 1 unit. Sec. I, M, 1–4; II, F, 1–4. Prerequisite: course 8 and satisfactory standing in 108A–108B. Fee, $10.

108F. Civil Engineering Laboratory.
Assistant Professor ALVAREZ, Mr. WISKOCIL and Mr. SHIELDS.

Physical tests of cement, concrete, timber, metal, and brick.

3 hrs., second half-year; 1 unit. M, 1–4. Elective for students of architecture only. Fee, $10.

109A. Sewerage Engineering. Professor HYDE.

The design and construction of sewerage works.

2 hrs., first half-year. M W, 8. Prerequisite: course 110.

109B. Sewage and Sewage Disposal. Professor HYDE.

The chemical and biological character of sewage; its treatment and disposal.

1 hr., first half-year. W, 9. Prerequisite: Chemistry 5 and 8A, Bacteriology 1.

110. Hydraulics. Professor HYDE.

Theory of hydraulics; application of principles; water measuring devices; stream gauging.

5 hrs., first half-year; 3 units. Tu Th, 8; Tu, 1–4. Prerequisite: Mathematics 4A–4B. Physics 105A–105B or Mechanics 102A–102B must be taken concurrently.

111A. Water Supply Engineering. Professor HYDE.

The design and construction of water works.

2 hrs., second half-year. Tu Th, 11. Prerequisite: course 110.

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111B. Character and Sanitation of Water Supplies. Professor HYDE.

Water from the aesthetic, commercial, and sanitary points of view; water purification.

1 hr., second half-year. M, 10. Prerequisite: Chemistry 5 and 8A; Bacteriology 1; Zoology 109C.

*112. Dams of Timber, Masonry, and Earth. Professor HYDE.

1 hr., first half-year. W, 11. Prerequisite: junior standing.

113. Foundations of Structures. Professor DERLETH.

Ordinary foundations, footings, sheet piling, piles, coffer-dams, open caissons, the pneumatic process; deep well dredging.

2 hrs., first half-year. Tu Th, 8. Prerequisite: course 108A–108B.

114. Masonry Structures. Professor DERLETH.

Design of typical masonry structures, such as dams, retaining walls, bridge piers, abutments, culverts, aqueducts, chimneys, stone and concrete arches, and arch bridges.

5 hrs., second half-year; 3 units. Tu Th, 8; W, 1–4. Prerequisite: course 108A–108B.

115. Fire-proofing. Assistant Professor ALVAREZ.

The resistance of building materials to fire; fire resistive and slow-burning construction; fire extinguishing equipment; corrosion and preservation of structural metal.

2 hrs., first half-year. M W, 11. Elective for students of civil engineering and architecture. Course 108A to be taken concurrently.

116. Engineering Contracts and Specifications. Professor HYDE.

The preparation and legal aspect of contract stipulations, forms, and instruments for advertisements, proposals, contracts, and bonds; specifications for various kinds of work and materials.

1 hr., second half-year. W, 11. Prerequisite: junior standing.

117. Framed Structures. Mr. WISKOCIL.

The computation of stresses in roofs, building frames and other structures, chiefly by analytical methods.

5 hrs., second half-year; 3 units. M W, 10; M, 1–4. Prescribed for architectural students who are taking course 118A–118B and Drawing 105.

118A–118B. Strength of Materials. Assistant Professor EDDY.

The elastic and ultimate resistance of materials; stress analysis for bars, beams, and columns; theory of resilience; deflections and combined stresses. Application of statics and the theory of the elasticity and strength of structural materials to the elements of design for buildings.

3 hrs., throughout the year; 3 units each half-year. M W F, 9. Prerequisite: Mathematics 4A–4B, Physics 1A–1B, Civil Engineering 8. Prescribed for students of architecture and for students of mining and metallurgy in the College of Mining.

*Not to be given, 1917-18.

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119. Thesis for B.S. Degree.

For the regulations governing thesis work see the annual Circular of Information, Academic Departments. Candidates for B.S. who elect a thesis in the department of Civil Engineering will register, during both half-years, of the last or senior year, for Civil Engineering 119. Candidates who elect their thesis in other departments will register according to announcements of those departments.

Students who contemplate theses in the civil engineering laboratories should notify the department before December of the junior year.

2 units each half-year.

123. Sanitary Engineering Laboratory.
Professor HYDE and Assistant Professor LANGELIER.

The chemical and biological examination of water and sewage, with particular reference to the analytical control of water purification and sewage treatment plants. Required of sanitary engineering students, but arrangements will be made for instruction of students in other departments.

9 hrs., first half-year; 3 units. M Tu W, 2–5. Prerequisite: Chemistry 5, or equivalent. Fee, $7.50.

124. Elementary Water Supply, Sewerage, and Municipal Wastes Engineering. Assistant Professor LANGELIER.

Water supply and sewerage works; purification of water; treatment of sewage and the disposal of refuse. Primarily designed for students of public health.

3 hrs., second half-year. M W F, 8. Prerequisite: junior standing.

125. Plumbing, Heating, Ventilating and Lighting.
Assistant Professor LANGELIER.

For students of home economics.

2 hrs., first half-year. M W, 11. Prerequisite: junior standing.

126. Applied Sanitary Science and Municipal and State Sanitation.
Professor HYDE.

The application of the principles of sanitary science to the work of municipal and state sanitation.

2 hrs., second half-year. Tu Th, 9. Prerequisite: Zoology 109C, Bacteriology 1, Chemistry 5 and 8A, and Civil Engineering 109B.

NOTE.—Special arrangements will be made for students in other courses and in other departments who may desire to take this course.

127. Sewage Disposal and Water Supply.
Assistant Professor LANGELIER.

Lectures and recitations, with outside reading on public and private water supply and sewage disposal installations. Arranged for students of architecture.

2 hrs., first half-year. Tu Th, 11. Prerequisite: junior standing.

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128. Sanitary Engineering Laboratory.
Professor HYDE and Assistant Professor LANGELIER.

The chemical and biological examination of water and sewage. Laboratory exercises and lectures on the interpretation of analyses. For students of public health; may be elected by students in other departments.

9 hrs., second half-year; 3 units. M Tu W, 2–5. Prerequisite: Chemistry 1A–1B. Fee, $7.50.

GRADUATE COURSES

*220A–220B. Framed Structures. Professor DERLETH.

The design of continuous girders, swing, cantilever, suspension and metallic arch bridges, and of reinforced concrete structures.

Throughout the year. Programme of work to be arranged each year. Prerequisite: course 107C–107D.

*221A–221B. Theory of Resilience and Deflections. Professor DERLETH.

Applications to the statically indeterminate structures.

Throughout the year. Programme of work to be arranged in each case. Prerequisite: course 107C–107D.

222A–222B. Sanitary Design. Professor HYDE.

The design of elements of systems for water supply, water purification, sewerage, sewage and refuse treatment and disposal, etc.

Throughout the year. Individual assignments. Prerequisite: courses 109A, 109B, 110, 111A, and 111B.

223. Laboratory Experiments.
Professor DERLETH, Assistant Professor ALVAREZ, Mr. WISKOCIL, and Mr. SHIELDS.

For advanced work in civil engineering the testing laboratory is equipped with apparatus specially designed to make tests and original studies upon the strength and elasticity of structural materials. Programme of work to be arranged in each case. Prerequisite: courses 8, 108A–108B, 108C, and 108E.

224. Harbor Engineering. Assistant Professor ALVAREZ.

Harbor planning; design and construction of breakwaters and docks; river improvements.

1 or 2 hrs., first half-year, to be arranged.

225. Advanced Sanitary Engineering Laboratory.
Professor HYDE and Assistant Professor LANGELIER.

Special laboratory problems in water, sewage, air, and refuse analysis; tests of apparatus, experimental or practical, in available localities.

Programme of work to be arranged in each case. Prerequisite: course 123. Fee, $2.50 per unit.

*Not to be given, 1917-18.

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DRAWING AND ART

HERMANN KOWER, C.E., Associate Professor of Drawing.
C. CHAPEL JUDSON, Assistant Professor of Antique Drawing.
WILLSON J. WYTHE, B.S., Assistant Professor of Mechanical Drawing.
EUGEN NEUHAUS, Assistant Professor of Decorative Design.
OLIVER M. WASHBURN, A.B., Assistant Professor of Classical Archaeology.
PERHAM W. NAHL, Instructor in Freehand Drawing and Art Anatomy.
ROSS J. BROWER, B.S., Instructor in Drawing.

Honor-students in the Upper Division. — Prospective candidates for honors must have the permission of the department before undertaking upper division work, and permission will be granted only to those who have shown proficiency in the lower division work and who have passed such examinations in the elementary subjects as may be required by the department. Credit for advanced work done in other institutions will be given only upon a satisfactory test in correlated lower division subjects.

Graphic Art.—Courses A–B, 1, 6, 7, and Engineering Drawing CD and 9 are normally prerequisite to honor-work in the upper division. The requirement of 24 units in major courses must normally include courses 102, 114, 115, 116 or 117, 118, 127, 128. Students are advised to elect Philosophy 36A–36B and to take the teachers' course offered in the summer session during the last year in college. Candidates of marked ability who have taken 24 units of varied upper division work with excellent results will be recommended for honors. A command of scientific and artistic perspective, creative ability in design as well as in color, and a thorough knowledge of artistic anatomy will be regarded as essential.

Engineering Drawing.—Courses CD, 3A, 3B, 3C, 9, and Graphic Art A–B are normally prerequisite to honor-work in the upper division. The requirement of 24 units in major courses must normally include courses 125, 101A–101B, Mechanics 6A, Architecture 101A–101B. Students are advised to elect courses 105, 107A–107B, 110, Mechanics 106B, and Mathematics 113. Candidates will be recommended for honors on the basis of the quality of the work done in the regular curriculum.

ENGINEERING DRAWING

LOWER DIVISION COURSES.

CD. Instrumental Drawing. Assistant Professor WYTHE.

Use of instruments; solving of geometrical problems; construction of mathematical curves; lettering; technical drawings.

6 hrs., either half-year; 2 units each half-year. Two sections: I, M F, 1–4; II, Tu Th, 1–4.

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3. Descriptive Geometry.
Associate Professor KOWER, Assistant Professor WYTHE, and Mr. BROWER.

Courses 3A, 3B and 3C are intended for students in architecture, candidates for teachers' recommendations and honor-students.

3A. Problems on points, lines and planes.

6 hrs., first half-year; 2 units. M F, 1–4. Prerequisite: course CD or matriculation subject 17.

3B. Problems on solids, warped and irregular surfaces.

6 hrs., second half-year; 2 units. M F, 1–4. Prerequisite: course 3A.

*3C. Problems on shades, shadows and perspective.

6 hrs., first half-year; 2 units. Prerequisite: course 3B or course 3D.

3D. An abridgment of courses 3A and 3B. Intended for engineering students.

9 hrs., either half-year; 3 units. Two sections: I, Tu Th S, 9–12; II, Tu W Th, 1–4. Prerequisite: same as for course 3A.

9. Lettering. Assistant Professor WYTHE.

Freehand and instrumental; various alphabets; construction of titles.

3 hrs., either half-year; 1 unit. Two sections each half-year. First half-year: I, M, 1–4; II, Th, 1–4. Second half-year: I, Tu, 1–4; II, F, 1–4. Prerequisite: course CD or matriculation subject 17.

UPPER DIVISION COURSES

101A–101B. Teachers' Training Course in Mechanical Drawing.
Assistant Professor WYTHE.

Various courses given in the secondary schools; methods of teaching; examination of text-books; visiting schools; drawing, with criticism.

1 hr., throughout the year; 1 unit each half-year. Th, 4. Prerequisite: senior or graduate standing.

105. Graphostatics.
Associate Professor KOWER, Assistant Professor WYTHE, and Mr. BROWER.

Graphic analysis of stresses in engineering structures.

2 hrs., second half-year; 2 units. Three sections: I, W, 2–4; II, Th, 2–4; III, F, 2–4. Prerequisite: Civil Engineering 108A and Physics 105A or Mechanics 102A.

107A–107B. Construction. Associate Professor KOWER.

Continuation of course 105, including the designing of engineering structures, such as roof-trusses, bridges, etc.

6 hrs., throughout the year; 2 units each half-year. M F, 1–4.

* Not to be given, 1917–18.

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110. Stereotomy. Associate Professor KOWER.

Continuation of course 3D, intended for students of architecture.

6 hrs., first half-year; 2 units. M F, 1–4.

125. Perspective. Assistant Professor WYTHE.

Continuation of course 3C, intended for those preparing to teach and for students of architecture.

3 hrs., second half-year; 2 units. M, 1–4.

GRADUATE COURSE

224A–224B. Seminar in Mechanical Drawing.
Associate Professor KOWER, Assistant Professor WYTHE, and Mr. BROWER.

Advanced work in mechanical drawing for graduate students.

Hours to be arranged.

GRAPHIC ART

LOWER DIVISION COURSES

A–B. Elementary Freehand Drawing. Mr. NAHL.

Drawing in pencil from models, embracing the study of light and shade and perspective; drawing from memory; with lectures.

3 hrs., throughout the year, beginning either in August or January; 1 unit each half-year. Three sections: I, M, 1–4; II, W, 1–4; III, F, 1–4. This course is equivalent to matriculation subject 16.

1A–1B (or 1C). General History of Art.
Assistant Professors WASHBURN and NEUHAUS.

Lectures on the development of art in the western world from the palaeolithic age to the present century.

1A. The first half-year's work extends through the art of Egypt, Mesopotamia, Greece, and Rome to the early Christian and Byzantine periods.

*1B. The second half-year's work deals with the art of the Renaissance and modern periods in Europe, alternating with

1C. which deals with the development of the fine arts, particularly painting, in our own country.

Sections will be provided for class study and a final examination given at the end of each half-year. Students will profit by a knowledge of general history.

3 hrs., first half-year. M W F, 3. 2 hrs., second half-year. M F, 3.

* Not to be given 1917–18; will be given 1918–19 and alternate years.

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6. Elementary Design. Assistant Professor NEUHAUS.

The principles that govern design. Geometrical forms as the basis of all design; the various laws of rhythm, balance, harmony, etc. Lectures, discussions and blackboard illustration; class problems in pencil and ink.

4 hrs., first half-year; 2 units. M F, 9–11. Prerequisite: course A–B, and Drawing CD.

7. Color Theory. Assistant Professor NEUHAUS.

A theoretical study of color problems with practical application in water color, tempera and crayons.

3 hrs., first half-year; 1 unit. W, 1–4. Prerequisite: course A–B and Drawing CD.

14A–14B. Advanced Freehand Drawing. Assistant Professor JUDSON.

6 hrs., throughout the year; 2 units each half-year. Two sections: I, Tu Th, 9–12; II, Tu Th, 1–4. Prerequisite: course A–B or matriculation subject 16.

UPPER DIVISION COURSES

102. Teachers' Training Course in Freehand Drawing. Mr. NAHL.

A presentation of freehand drawing for students preparing to teach. Relation of drawing to other subjects, methods of teaching and selection of materials.

1 hr., second half-year; 1 unit. M, 4. Prerequisite: senior or graduate standing.

114A–114B. Advanced Work in Freehand Drawing.
Assistant Professor JUDSON.

Continuation of course 14A–14B.

6 hrs., throughout the year; 2 units each half-year. I, Tu Th, 9–12; II, Tu Th, 1–4. Prerequisite: course 14A–14B.

115A–115B. Drawing from Model; Composition.
Assistant Professor JUDSON.

3 hrs., throughout the year; 1 unit each half-year. W, 9–12. Prerequisite: course 114A–114B.

116A–116B. Still-life Painting. Assistant Professor JUDSON.

3 hrs., throughout the year; 1 unit each half-year. M, 9–12. Prerequisite: course 114A–114B.

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117A–117B, 117C–117D. Advanced Color Study.
Assistant Professor NEUHAUS.

Practical problems in all mediums except oils, applied to decorative purposes.

3 hrs., throughout two years; 1 unit each half-year. F, 1–4. Prerequisite: courses 6 and 7. Students should register for 117A–117B in the first year; 117C–117D in the second year.

118A–118B, 118C–118D. Advanced Design. Assistant Professor NEUHAUS.

Natural objects and their translation into conventional forms. Practical application of design in pencil and water color. Stenciling, wood-block printing.

3 hrs., throughout two years; 1 unit each half-year. M, 1–4. Prerequisite: courses 6 and 7. Students should register for 118A–118B in the first year; 118C–118D in the second year.

127A–127B. Art Anatomy. Mr. NAHL.

The proportions and the general appearance of the human form.

1 hr., throughout the year; 1 unit each half-year. F, 4. Prerequisite: course 114A.

128A–128B. Art Anatomy Practice. Mr. NAHL.

Drawing in charcoal from bones, anatomical casts and life models, in light and shadow, direct and foreshortened.

3 hrs., throughout the year; 1 unit each half-year. Th, 9–12. Prerequisite: course 127A–127B.

168. Community Art. Assistant Professor NEUHAUS.

Discussion of the aesthetic problems of community life. The promotion of artistic appreciation through the fine and applied arts. Intended to be especially helpful to prospective teachers and also to others, who are interested in the many practical and aesthetic problems in and outside of the school and home.

1 hr., first half-year. Tu, 8 p.m. Prerequisite: senior or graduate standing.

199. Pro-seminar in Graphic Art.
Assistant Professors JUDSON and NEUHAUS and Mr. NAHL.

According to the interests and requirements of the students in the course.

3–6 hrs., either half-year; 1–2 units. Hours to be arranged.

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GRADUATE COURSES

216A–216B. Advanced Still-life Painting. Assistant Professor JUDSON.
Continuation of course 116A–116B.
3 hrs., throughout the year; 1 unit each half-year. Tu, 1–4. Prerequisite: course 116A–116B.

217A–217B. Continuation of course 117A–117B.
Assistant Professor NEUHAUS.
Hours to be arranged.

218A–218B. Continuation of course 118A–118B.
Assistant Professor NEUHAUS.
Hours to be arranged.

228A–228B. Continuation of course 128A–128B. Mr. NAHL.
3 hrs., throughout the year; 1 unit each half-year. Th, 9-12.

269. Seminar in Graphic Art.
Assistant Professors JUDSON and NEUHAUS and Mr. NAHL.
According to the interests and requirements of the students in the course.
3–6 hrs., either half-year; 1–2 units. Hours to be arranged. Prerequisite: graduate standing.

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ECONOMICS

CARL C. PLEHN, Ph.D., LL.D., Professor of Finance on the Flood Foundation.

HENRY R. HATFIELD, Ph.D., Professor of Accounting on the Flood Foundation; Dean of the College of Commerce.

STUART DAGGETT, Ph.D., Professor of Railway Economics, on the Flood Foundation.

LINCOLN HUTCHINSON, M.A., Professor of Commerce on the Flood Foundation.

JESSICA B. PEIXOTTO, Ph.D., Associate Professor of Social Economics.

LUCY W. STEBBINS, A.B., Associate Professor of Social Economy.

IRA B. CROSS, Ph.D., Associate Professor of Economics on the Flood Foundation.

[2]CHARLES E. BROOKS, Ph.D., Assistant Professor of Insurance.

WARNER BROWN, Ph.D., Assistant Professor of Psychology.

JOHN F. FORBES, Certified Public Accountant, Lecturer in Accounting.

[1]PAUL A. SINSHEIMER, B.L., Special Lecturer in Economics.

HERBERT S. SHUEY, B.S., Special Lecturer in Commerce.

FREDERICK R. MACAULAY, LL.B., M.A., Instructor in Economics.

J. EVAN ARMSTRONG, A.B., Instructor in Stenography and Typewriting.

CHARLES C. STAEHLING, Ph.B., Instructor in Accounting.

ELBERT A. KINCAID, M.A., Instructor in Economics.

LOUISE MORROW, A.B., M.D., Assistant in Social Economics.

CLARA E. MORTENSON, M.S., Assistant in Economics.

FELIX FLÜGEL, M.A., Assistant in Economics.

Facilities for Graduate Study.—The University Library is well supplied with works on economic subjects, and in particular with official statistical publications of the chief commercial countries of the world. These materials, with the official trade documents of the San Francisco Customs House, afford opportunity for the study of the trade, resources, and economic geography of particular countries and ports. The unique collection of local materials in the Bancroft Library is available for research in the economic history of the Pacific Coast. A collection of state reports and documents on public finance, complete for the last nine years, and in some instances extending over a longer period, may be consulted in the private library of Professor Plehn.

Special facilities also exist at Berkeley for the study of economic problems at first hand. San Francisco is the banking center of the Coast; and the banking system here is peculiar because of the actual circulation of gold coin, direct Oriental and European exchange, and crop movements practically continuous throughout the year. San Francisco is also the terminus of three great railways. The distance of California from the Middle West has given great importance to questions of transportation,

[1]In residence first half-year only; [2], second half-year only.

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and rate questions are subjects of constant interest. Mention may also be made of the completeness of labor organization in some parts of California and of its absence in others, of problems of seasonal labor, of the presence of newly opened oil fields, free as yet from control of the trusts, of irrigating plants, lumbering on a large scale, experiments in co-operation, and the like.

To those interested in social work the high level of income in San Francisco and the consequent importance of preventive or constructive charity also affords matter for investigation.

The courses prerequisite to advanced work in the Department of Economics are Economics 1A–1B and either Political Science 1A, 1B, or History 1A–1B. A reading knowledge of French and German is eminently desirable, and will ordinarily be required of students in the College of Commerce or honor-students in economics.

Honor-students in the Upper Division.—Students in the College of Letters and Science may receive honors in economics at graduation either

1. Upon the intelligent completion of a course of reading in some general field, or,

2. Upon the basis of a thesis showing ability to do original work.

In either case, candidates for honors must prepare a programme at the beginning of their candidacy in consultation with a committee of the department appointed to supervise their work. On approval of this plan of study, the student will proceed to its completion in close co-operation with his committee, attending conferences and making such reports of progress as may be asked for. Students are advised against too narrow specialization. In most cases, the junior year will be spent in preliminary reading. In the senior year, those students who desire to take honors on the basis of reading alone will make that reading more intensive, and will prepare for a final oral examination in which their attainment will be tested; while those who desire to engage in research will prepare a thesis embodying their results.

Honor-students will be allowed much freedom in their studies. To justify this, the work which they do must be consistently of high quality. The department will recommend the exclusion from the honor-group of all students who do not maintain each half-year an average of at least sixty per cent of first and second grades in all their courses and who do not complete their courses in economics with high credit.

All senior students will enroll in course 199A–199B. Juniors, subject to the approval of the department committee on honors, will either enroll in Course 198A–198B or be assigned to various courses in economics as their individual needs may require.

LOWER DIVISION COURSES

A. Elementary Stenography and Typewriting. Mr. Armstrong.

Recitations four hours a week, each recitation requiring outside preparation; and in addition four hours a week of typewriting under the instructor's supervision. Exclusively for students in the College of Commerce and for students preparing for the teaching of commercial work in the high schools. Not open to special students.

8 hrs., either half-year; 4 units. First half-year: M Tu Th F, 1–3; second half-year: M Tu Th F, 3–5. Fee, $10.

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B. Intermediate Stenography and Typewriting. Mr. ARMSTRONG.

8 hrs., either half-year; 4 units. First half-year: M Tu Th F, 3–5; second half-year: M Tu Th F, 1–3. Prerequisite: course A. Fee, $10.

1A–1B. Principles of Economics.

Professors PLEHN, HATFIELD, HUTCHINSON, and DAGGETT, Associate Professors PEIXOTTO, STEBBINS, and CROSS, Assistant Professor BROOKS, Mr. MACAULAY, and Assistants.

3 hrs., throughout the year. Lecture: Tu, 9, and two periods a week of section work to be arranged. Prescribed for all students in the College of Commerce. Prerequisite: at least sophomore standing.

3A. Introduction to Economic Geography. Professor HUTCHINSON.

The relations between geography and economics.

3 hrs., second half-year. M W F, 10. Prerequisite: Geography 1A.

3B. The Geography of International Trade. Professor HUTCHINSON.

The economic geography of the chief modern commercial nations.

3 hrs., first half-year. M W F, 10. Prerequisite: course 3A.

6. Advanced Stenography and Typewriting. Mr. ARMSTRONG.

8 hrs., second half-year; 4 units. M Tu Th F, 2–4. Prerequisite: courses A and B. Fee, $10.

14A–14B. Principles of Accounting.

Professor HATFIELD and Mr. STAEHLING.

4 hrs., throughout the year; 3 units each half-year. Recitation, Tu Th, 8. Laboratory periods, eight sections: I, W, 3–5; II, Th, 10–12; III, Th, 2–4; IV, F, 2–4; V, M, 10–12; VI, M, 1–3; VII, Tu, 10–12; VIII, Tu, 2–4. Prerequisite: at least sophomore standing. Students enrolling in this course may take an extra laboratory period each half-year with one additional unit credit.

UPPER DIVISION COURSES

Theory

100. Economic Theory. Mr. MACAULAY.

An intermediate course in theory.

3 hrs., first half-year. M W F, 9. Prerequisite: course 1A–1B.

101. History of Economic Thought. Mr. MACAULAY.

A review of economic thought from the earliest times through Adam Smith.

3 hrs., second half-year. M W F, 9, Prerequisite: course 1A–1B.

102. Classical Economists. Mr. MACAULAY.

A critical and historical study of the English classical school.

3 hrs., first half-year. M W F, 10. Prerequisite: course 1A–1B.

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103. Advanced Economics. Mr. MACAULAY.
An introduction to modern mathematical and statistical economic theory.
3 hrs., second half-year. M W F, 10. Prerequisite: course 1A–1B.

104. Economic Cycles. Mr. MACAULAY.
An analytic study of the economic phenomena of business prosperity, crisis, depression and revival. A critical examination of some of the more important modern theories.
2 hrs., second half-year. M W, 11. Prerequisite: course 1A–1B.

106. Contemporary Theories of Social Reform.
Associate Professor PEIXOTTO.
The principles and programmes of the leading reform movements of the day which aim at the partial or total reconstruction of industrial society, with some historical review of these movements.
3 hrs., first half-year. M W F, 3. Prerequisite: course 1A–1B and at least junior standing.

Economic History

110. Economic and Commercial History. Associate Professor CROSS.
A general survey of some of the most important events in the economic history of the world.
3 hrs., first half-year. M W F, 9. Prescribed for students in the College of Commerce.

111. Industrial History of the United States. Professor DAGGETT.
A broad discussion of economic conditions in the United States from 1789 to 1915.
3 hrs., second half-year. M W F, 9.

*112. Modern Industrialism. Associate Professor CROSS.
The rise and development of the modern industrial system with special reference to the workings of competition; the trust problem.
3 hrs., second half-year. M W F, 9. Prerequisite: course 1A–1B.

Business Organization and Management

120. Business Organization and Administration.
A survey of the problems which rise in production within the factory and in the sale and distribution of the product.
2 hrs., first half-year. Tu Th, 9. Prerequisite: course 1A–1B.

121. Factors of Industrial Efficiency.
Modern competitive production. Limited usually to seniors in the College of Commerce and seniors whose major is economics. The consent of the instructor must be obtained before enrollment.
2 hrs., first half-year. Tu Th, 10.

* Not to be given, 1917–18.

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122. Office Organization, Administration and Procedure.

A detailed study of the problems which arise in the organization, administration, and procedure of the American office. Exclusively for students in the College of Commerce and for students preparing for the teaching of commercial work in the high schools. Not open to special students.

2 hrs., first half-year. Tu Th, 2.

125. Advertising. Assistant Professor BROWN.

The principles governing the choice of media, the frequency of appeal, the amount and nature of the matter, and the choice of methods of appeal, with emphasis upon experimental methods of measuring the effectiveness of advertising. Weekly lectures, investigation and criticism of advertisements, and one hour of conference.

2 hrs., second half-year. Lecture, Th, 7:30 p.m. Conference hours to be arranged.

126. Economics of Agriculture. Mr. KINCAID.

Agricultural commerce, economic factors in agricultural production, land values, rural credits, and, in general, rural economics.

3 hrs., second half-year. Tu Th alt. S, 11. Primarily for students in the colleges of Agriculture and Commerce.

127A–127B. Commercial Reviews and Trade Journals.
Associate Professor CROSS and ——.

Reading of current commercial and trade journals.

1 hr., throughout the year; 1 unit each half-year. Tu, 4. Prescribed for and open only to seniors in the College of Commerce.

Finance

130. American Financial Policy. Professor PLEHN.

The legislation and experience of the United States touching currency, banking, debt, taxation, expenditure, etc.

3 hrs., second half-year. M W F, 2. Prerequisite: course 1A–1B.

131. Introduction to Public Finance. Professor PLEHN.

The theory and methods of taxation; the expenditure and administration of public funds; public debts.

3 hrs., first half-year. M W F, 2.

133. Corporation Finance. Professor HATFIELD.

2 hrs., first half-year. Tu Th, 3.

134. Investments. Professor HATFIELD.

3 hrs., second half-year. M W F, 8.

135. Elements of Money and Banking. Associate Professor CROSS.

3 hrs., first half-year. M W F, 10.

136. Foreign Exchange. Associate Professor CROSS.

3 hrs., second half-year. M W F, 9. Prerequisite: course 135.

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137. Advanced Money and Banking. Associate Professor CROSS.
3 hrs., second half-year. M W F, 10. Prerequisite: course 135.

Economic Cycles. [See course 104.] Mr. MACAULAY.

Statistics and Insurance

140. Elementary Statistics. Assistant Professor BROOKS.
The history, theory, and methods of statistics. Statistical methods used in research and in the presentation of facts in economic, social, hygienic, biological and other fields where such methods have a practical or a scientific application. A knowledge of higher mathematical analysis is not required.
4 hrs., second half-year, including one laboratory period; 3 units. Tu Th, 11, and a laboratory period to be arranged.

141. Statistics in the Service of Business. Mr. MACAULAY.
3 hrs., first half-year, including one laboratory period. M W, 11, and a laboratory period to be arranged. Prerequisite: course 140. Class to be limited at the discretion of the instructor.

*142. Advanced Statistics. Assistant Professor BROOKS.
A mathematical treatment of frequency curves and the theory of correlation.
2 hrs., second half-year. Tu Th, 10. The consent of the instructor must be obtained before enrollment.

143. Economics of Insurance. Assistant Professor BROOKS.
An elementary course in the principles of insurance. Mathematical treatment will be avoided, as far as possible.
2 hrs., second half-year. Tu Th, 9.

144. Life Insurance. Assistant Professor BROOKS,
History of life insurance; forms of company organization and management; surplus; taxation. Mathematical treatment will be avoided.
3 hrs., second half-year. M W F, 9. Prerequisite: course 143.

*145. Property Insurance. Assistant Professor BROOKS.
Fire, marine, burglary, automobile, plate glass, boiler, fly-wheel, etc.
3 hrs., first half-year. M W F, 9. Prerequisite: course 143.

146. Social Insurance. Assistant Professor BROOKS.
Health, unemployment, workmen's compensation, industrial and old age insurance.
3 hrs., second half-year. M W F, 10.

147. Special Problems in Social Insurance.
2 hrs., second half-year, to be arranged. Limited to a small number of students whose records indicate ability to do advanced work. The consent of the instructor must be obtained before enrollment.

* Not to be given, 1917–18.

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148B. Actuarial Science. Assistant Professor BROOKS.

The mathematical theory of insurance.

3 hrs., second half-year. Tu Th S, 10. The consent of the instructor must be obtained before enrollment.

NOTE.—Students who wish to prepare themselves for actuarial work should confer with the instructor concerning the best choice of their mathematical courses.

Labor

150. Labor Problems.

The labor problems of modern industry with particular reference to America since the rise of the big corporation.

3 hrs., second half-year. M W F, 10. Prerequisite: course 1A–1B.

151. Labor Legislation.

The development and present status of labor legislation in industrial countries.

3 hrs., second half-year. M W F, 9. Prerequisite: course 1A–1B.

Accounting

160. Accounting Systems. Professor HATFIELD.

Principles of accounting as applied to different forms of enterprise.

3 hrs., first half-year. M W F, 8. Prerequisite: course 14A–14B.

161. Cost Accounting. Mr. FORBES.

4 hrs., second half-year; 2 units. W, 7:30–9:30 p.m. and one laboratory period to be arranged. Open to advanced students on consent of instructor.

162. Auditing. Mr. FORBES.

Open only to students who have completed course 14A–14B or who give other evidence of competency.

2 hrs., first half-year. W, 7:30–9:30 p.m.

163A–163B. Advanced Accounting Problems. Professor HATFIELD.

Investigation and reports on suggested topics.

2 hrs., throughout the year. Class to be limited at the discretion of the instructor.

164A–164B. Public Utility Accounts. Mr. FORBES.

1 hr., throughout the year. Th, 8. Prerequisite: course 14A–14B.

*165A–165B. Municipal Accounts. Mr. FORBES.

1 hr., throughout the year. Th, 8. Prerequisite: course 14A–14B.

166. Teachers' Course. Professor HATFIELD.

The scope and methods of teaching bookkeeping and allied subjects in the high school.

2 hrs., second half-year. Hours to be arranged. Prerequisite: a knowledge of bookkeeping.

* Not to be given, 1917–18.

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167. Partnership Accounts. Mr. STAEHLING.
2 hrs., second half-year. Tu Th, 8. Prerequisite: course 14A–14B.

Transportation and Foreign Trade

170A–170B. The Statistics of International Trade.
Professor HUTCHINSON.
2 hrs., throughout the year. Tu Th, 2. Prerequisite: at least junior standing and a reading knowledge of some modern European language other than English. The consent of the instructor must be obtained before enrollment.

171. Economic Geography of South America. Professor HUTCHINSON.
2 hrs., second half-year. Tu Th, 9. Prerequisite: course 3A.

172A–172B. The Commerce of the Orient. Mr. SHUEY.
The commercial development of the oriental countries in recent years, with special reference to China and Japan.
2 hrs., throughout the year. Weekly two-hour evening session to be arranged to suit the convenience of the class. Prerequisite: junior standing.

173. Railway Economics. Professor DAGGETT.
A general discussion of railway history, rates, finances, and regulation.
3 hrs., first half-year. M W F, 2. Prerequisite: course 1A–1B.

*174. Railway Traffic. Professor DAGGETT.
Railway organization, forms, accounts, rates and rate construction.
3 hrs., second half-year. M W F, 3. Prerequisite: course 173.

175. Railroad Regulation. Professor DAGGETT.
Mainly concerned with the Interstate Commerce Act.
3 hrs., second half-year. M W F, 2. Prerequisite: course 173.

176. The History of Railroads in California. Professor DAGGETT.
3 hrs., first half-year. M W F, 3. Prerequisite: course 173.

177. Public Utility Finance. Mr. SINSHEIMER.
The regulation of public utilities, with special reference to the issues of their securities.
2 hrs., first half-year. Tu, 7:30 p.m. Prerequisite: courses 14A–14B and 173.

Social Economics

180. The Control of Poverty. Associate Professor PEIXOTTO.
Studies of the facts and causes of poverty and of contemporary proposals for its prevention. Lectures, reports, visits to appropriate philanthropic and industrial institutions, and other field work. An additional unit will be given to those who elect to take the excursions and field studies offered in connection with the course.
3 hrs., first half-year. M W F, 2. Prerequisite: course 1A–1B and at least junior standing.

* Not to be given, 1917–18.

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181. Care of Dependents. Associate Professor STEBBINS.

The problems of outdoor and institutional care of the dependent and defective classes. Lectures, reports, and field work.

3 hrs., second half-year. M W F, 3. Prerequisite: course 180 or its equivalent.

182. The Household as an Economic Agent.
Associate Professor PEIXOTTO.

Studies in the theory and practice of spending, with special reference to household budgets.

3 hrs., second half-year. M W F, 2.

183. Crime as a Social Problem. Associate Professor PEIXOTTO.

3 hrs., second half-year. M W F, 3.

Honor-Courses

198A–198B. Honor-Course for Juniors. The STAFF.

Throughout the year. Hours to be arranged.

199A–119B. Honor-Course for Seniors. The STAFF.

Throughout the year. Hours to be arranged.

GRADUATE COURSES

Graduate students are also referred to "Upper Division Courses" listed in the preceding pages.

201A–201B. Conference in Economic.
Professor PLEHN and Members of the Department.

Under this head are included arrangements for the guidance of the work of graduate students in the preparation of theses for higher degrees. Subjects may be chosen in the following fields: accounting (HATFIELD); economic theory (MACAULAY); foreign trade (HUTCHINSON); insurance (BROOKS); money, banking, and foreign exchange (CROSS); public finance (PLEHN); social economics (PEIXOTTO); stenography (ARMSTRONG); transportation (DAGGETT). The results will be presented to the seminar for discussion as occasion may suggest.

2 hrs., throughout the year. Alternate W, 7:30 p.m.

202A–202B. Advanced Studies in Social Economics.
Associate Professor PEIXOTTO.

Research in problems of social economics.

3 hrs., throughout the year. Alternate M, 7:30–9:30 p.m., and additional hours to be arranged.

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203A–203B. Advanced Studies in Social Economics.
Associate Professor PEIXOTTO and Dr. MORROW.

Field work in connection with course 202A–202B. Students who register in this course give three half-days weekly as volunteer members of staff in the offices of state commissions, private charities, juvenile courts, or kindred agencies, or carry on some social study under direction.

Throughout the year; 3 units each half-year. Hours to be arranged.

204A–204B. Government Finance. Professor PLEHN.

War finances of the nations involved in the great war.

2 hrs., throughout the year. M, 3–5. Prerequisite: course 131.

COURSES IN OTHER DEPARTMENTS

Social Psychology. [See Philosophy 145.]

Philosophies of Social Relations. [See Philosophy 45A–45B.]

Co-operation in Marketing. [See Rural Institutions 201.]

Rural Credits and Land Settlement. [See Rural Institutions 202.]

Fundamentals of Modern Geography. [See Geography 1A.]

Geography of the Americas. [See Geography 116A.]

Geography of Europe. [See Geography 116C.]

Commerce and Industry of Japan. [See Oriental Languages 121A–121B.]

The Economic Conditions of China. [See Oriental Languages 128A–128B.]

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EDUCATION

ALEXIS F. LANGE, Ph.D., Professor of the Theory and Practice of Education and Director of the School of Education.

RICHARD G. BOONE, Ph.D., Professor of Education.

IRA W. HOWERTH, Ph.D., Professor of Education.

CHARLES E. RUGH, M.L., Professor of Education.

WILLIAM W. KEMP, Ph.D., Professor of School Administration.

W. SCOTT THOMAS, A.B., Assistant Professor of Education and Examiner of Schools.

JOHN S. BOLIN, M.A., Instructor in Education.

Undergraduate and graduate courses are offered which may serve non-professional as well as professional purposes. It is believed that such courses provide instruction which is desirable for individual culture and training and as preparation for that intelligent participation in public and private education which good citizenship demands of educated men and women.

The courses properly preliminary to advanced work in the Department of Education are Philosophy 1 (Logic), or Zoology 1, or Physiology 1, or Political Science 1A or 1B, or Economics 1A–1B; Philosophy 2A (Psychology), and Philosophy 104A–104B (Ethics). The course in ethics may, however, be taken concurrently with major courses in education. A student in the upper division who is specializing in education should normally elect Education 116 and one of the following courses: Jurisprudence 109 (School Legislation of California), Economics 106 (Contemporary Theories of Social Reform), Hygiene 101 (Child Hygiene), and Zoology 104 (Animal Behavior).

Special provision is made for the professional training of teachers of three classes:

A. Those preparing to become teachers in secondary schools or in colleges.

For the conditions under which recommendations for Teachers' Certificates of the high school grade are issued, see Announcement of the School of Education. For the year 1917–18 the 15 units for professional requirements may be made up as follows:

I. HISTORY OF EDUCATION. Either 103B, 3 units, or 125, 3 units.

II. THEORY OF EDUCATION. Required, either 105B, 2 or 3 units; or 107, 2 units; or 121, 3 units; or 226, 2 units.

III. THEORY AND METHOD OF SCHOOL PRACTICE. Required, 223, 1 unit.

IV. PRACTICE TEACHING. Required, 201, 4 units.

In addition, "a teacher's course in at least one subject, if such course be given in the institution and be accepted by or listed under the work in education, a maximum of three units for all such courses."

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It is very desirable that Philosophy 2A (Psychology), or an equivalent course be taken as preliminary to these courses or as a companion course with one or more of them. Students who have not had such preparation will be expected to take readings in psychology in connection with the courses listed above, and to pass an examination in this subject in case they desire to qualify for the recommendation for the High School Teacher's Certificate. For other desirable courses see the foregoing statements concerning courses preliminary to advanced work. Students are expected to distribute the work over their senior and graduate years.

B. Those preparing to engage in school administration, to become principals or superintendents of public schools, or to teach in normal schools or in college departments of education.

Special courses will be arranged to meet the needs of individual students.

C. Graduates of normal schools, who are making further preparation for teaching in elementary schools.

UPPER DIVISION COURSES

History of Education

103A. The History of Education: Earlier Periods. —— ——.

The development of educational thought and practice up to the close of the medieval period.

2 hrs., second half-year, to be arranged.

103B. The History of Education: Later Periods.
Professor KEMP and Mr. BOLIN.

The development of educational thought and practice from the Renaissance to the present, viewed as a phase of social progress.

3 hrs., either half-year. Three sections: I, M W F, 8; II, M W F, 3; III, to be arranged.

125. The History of American Education.
Professor BOONE and Mr. BOLIN.

An historical study of the leading ideas and ideals of American education and of the institutions in which they have been embodied.

3 hrs., either half-year. Three sections: I, III, M W F, 8; II, M W F, 2.

Educational Psychology

110. The Psychological Basis of Secondary Education. Professor BOONE.

An investigation into the processes and methods of learning and of teaching from the point of view of the psychology of adolescence.

3 hrs., first half-year. M W F, 10.

111. Social Psychology. Professor HOWERTH.

A study of the evolution and functioning of the social mind, with special reference to education.

2 hrs., second half-year. Tu Th, 2.

117. Selected Topics in Educational Psychology.

Hours to be arranged.

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Theory of Education

104A. The Biological Principles of Education. Professor HOWERTH.

The biological foundations of educational theory. The principles and practices of formal education as based upon and derived from the methods of nature in the development of plants, animals, and man.

3 hrs., first half-year. M W F, 2.

104B. The Sociological Principles of Education. Professor HOWERTH.

A study of the evolution of society and of social institutions, with particular reference to the relation of formal education to the progress of society.

3 hrs., second half-year. M W F, 2.

105A. The Theory of Education. Professor LANGE.

A study of fundamental principles, processes, and methods, with special reference to national culture and ideals.

3 hrs., first half-year. M W F, 9.

105B. The Principles of Secondary Education.
Professors LANGE and BOONE.

A study of the theoretical and the broader practical aspects of the secondary stage of education, with special reference to the American high school system.

2 hrs., either half-year. Two sections: I, M W, 9; II, M W, 11.
Professor BOONE.

3 hrs., second half-year. Section III, M W F, 9. Professor LANGE.

121. The High School. Assistant Professor THOMAS.

A study of the concrete problems of the high school, with particular reference to questions of aims, curriculum, instruction, and management.

3 hrs., first half-year. Two sections, M W F, 2 and 3.

126. Principles of Elementary Education. Professor RUGH.

A course for principals and teachers in the elementary schools.

2 hrs., first half-year. Tu Th, 3.

127. Moral Education. Professor RUGH.

The moral life as a personal response to the social order. The school as a means of moral education.

2 hrs., second half-year. Tu Th, 8.

School Organization and Administration

106. School Systems. Assistant Professor THOMAS.

The development and present status of typical European systems of education, particularly those of Germany, France, and England.

2 hrs., first half-year. Tu Th, 10.

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107. The Administration of Public Education. Professor KEMP.
2 hrs., either half-year. M W, 3.

108. Contemporary Movements in Education. Professor KEMP.
A survey of educational discussion and practice touching on urgent administrative problems of the day. The course is designed primarily for advanced students with teaching experience who desire to prepare for the administrative side of school work.
2 hrs., first half-year. S, 10–12. Prerequisite: course 107 or teaching and administrative experience.

109. Problems in the Administration and Supervision of Schools. Professor KEMP.
Designed primarily for advanced students with teaching experience who desire to prepare for the administrative side of school work.
2 hrs., second half-year. S, 10–12. Prerequisite: course 107 or teaching and administrative experience.

112. The Intermediate School. Professor RUGH.
2 hrs., first half-year, to be arranged.

114. The American University-College. Professor LANGE.
The evolution, character, and function of the American university as an organ of the body politic; its organization in the light of its inherent purposes; curricula and instruction; the meaning of academic citizenship; relation of student activities to university aims; progressive policies; the Junior College movement. Lectures, discussions, debates.
2 hrs., first half-year. Tu, 3–5.

116. Pro-seminar: Selected Topics in the Theory and Practice of Secondary Education. Professors BOONE and KEMP.
2 hrs., either half-year, to be arranged. Prerequisite: at least two of the preceding courses. Admission only on consultation with the instructor.

FREE ELECTIVE COURSE

11. Education and Culture. Mr. BOLIN.
Stereopticon lectures on the evolution of educational thought and practice.
1 hr., first half-year. M, 4.

GRADUATE COURSES

RESEARCH COURSES

207. Educational Seminar. Professor LANGE.
Topics change from year to year. Admission only on consultation with the instructor.
2 hrs., throughout the year. M, 7:30–9:30 p.m.

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208. Public Administration of School Systems. Seminar.
Professor KEMP.

2 hrs., throughout the year. W, 7:30–9:30 p.m.

210. Society and Education. Professor HOWERTH.

Social phases of education, including an intensive study of one or more of the great treatises on the subject of education from the social viewpoint. The particular author to be studied will be selected after consultation with the class.

2 hrs., first half-year. Th, 4–6.

211. School Organization. Professor LANGE.

The parts of the state school system and their articulation, with special reference to secondary education in California. Admission on consultation with instructor.

2 hrs., second half-year. Th, 7:30–9:30 p.m.

215. Special Studies. The Department Staff.

This course offers an opportunity for individual and for group study of the seminar type. During the past two years several groups have been at work, one on vocational guidance, another on vocational opportunities for college women, a third on the intermediate school, and a fourth on school legislation. These are likely to be continued. Suggested for group study: educational surveys, educational research bureaus, organization of vocational training, rural life and education, social centers, supplementary educational agencies.

Hours to be arranged.

PROFESSIONAL COURSES

218. Language and Literature in Secondary Schools. Professor LANGE.

Language and literature as educational means; principles, material, and methods of instruction; the arts of interpretation and translation; practical exercises, oral and written.

3 hrs., first half-year. M W F, 10.

226. Introduction to Educational Method. Professor RUGH.

The school subjects, their nature and subdivisions into lessons; the nature, place, and assignment of the lesson; the recitation; principles of explanation applied to high school subjects.

2 hrs., first half-year. Tu Th, 3.

222. Principles of Study and Presentation.
Assistant Professor THOMAS.

A consideration of the psychological fundamentals of study and its direction; typical processes in their relation to general educational theory.

2 hrs., first half-year. S, 9–11.

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223. School Management. Professor RUGH.
1 hr., either half-year. Th, 4.

219. Vocational Training. Professor BOONE.
Principles, materials, and methods of instruction.
3 hrs., second half-year. M W F, 10.

201. The Practice of Teaching. Professor RUGH and Mr. BOLIN.
Lectures, readings, and conferences, together with school observation and practice of teaching, under the direction of the instructor. The school observation and practice teaching ordinarily require one period daily for five days a week, but students are expected to have two consecutive free hours between 9 and 3 o'clock throughout the week in order to facilitate making the teaching assignments. Required of all candidates for the Teacher's Recommendation whose pedagogical training is taken at this University.
4 hrs., either half-year. W F, 4; and a conference hour to be arranged. Prerequisite: I, Education 103B, or 125; II, Education, 105B, or 121 or 127; and III, Education 223. But the course elected under III may be taken in conjunction with this course.

TEACHERS' COURSES ARE OFFERED IN THE SCHOOL OF EDUCATION BY THE DEPARTMENTS LISTED BELOW.

Agriculture.
Drawing and Art.
Economics.
Education.
English.
Geography.
German.
History.
Home Economics.
Hygiene.
Latin.
Music.
Physical Education.
Physics.
Physiology.
Public Speaking.
Romanic Languages.
Zoology.

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ENGLISH

CHARLES MILLS GAYLEY, Litt.D., LL.D., Professor of the English Language and Literature.
CORNELIUS B. BRADLEY, M.A., Professor of Rhetoric, Emeritus.
*CHAUNCEY W. WELLS, A.B., Associate Professor of English Composition.
WILLIAM D. ARMES, M.L., Associate Professor of American Literature.
WALTER M. HART, Ph.D., Associate Professor of English Philology.
BENJAMIN P. KURTZ, Ph.D., Associate Professor of English.
THOMAS F. SANFORD, A.B., Assistant Professor of English Literature.
HERBERT E. CORY, Ph.D., Assistant Professor of English.
HAROLD L. BRUCE, Ph.D., Assistant Professor of English Composition.
EMMA J. BRECK, Ph.B., Lecturer in the Teaching of English.
GEORGE R. MACMINN, A.B., Instructor in English.
*LEONARD BACON, A.B., Instructor in English.
WILLIAM W. LYMAN, JR., M.A., Instructor in Celtic and English.
ARTHUR G. BRODEUR, Ph.D., Instructor in English Philology.
AUBREY BOYD, M.A., Instructor in English.
GUY MONTGOMERY, M.A., Instructor in English.
WILLIAM CHISLETT, JR., Ph.D., Instructor in English.
ROBERT H. CLARK, A.B., Instructor in English.
ADOLPH E. ANDERSON, A.B., Teaching Fellow in English and Secretary of the Committee on Students' English.
JOHN L. SEYMOUR, A.B., Teaching Fellow in English.

INFORMATION FOR LOWER DIVISION STUDENTS

Prescribed and Prerequisite Courses.—Regular students who undertake the work of this department must have credit for entrance English 1 or 14. Applicants for special status who intend to take courses in the department of English may be required to pass the regular matriculation examinations at the usual time and place. Such applicants should consult the secretary of the department by letter, or personally, concerning the preliminary reading or formal entrance examinations to be required of them.

Course 1A–1B, or Public Speaking 1A–1B, fulfills the prescription for all colleges and curricula; and one or the other must be taken by all students, special as well as regular, before they can be admitted to courses of the upper division. Students desiring to engage in systematic study in the upper division must add to the preceding, one of the lower division year-courses 2, 3, 17, 25; and, if desired, such course may be taken at the same time as course 1. Courses 1C and 1D are specially designed to meet the needs of students in the colleges of applied science and commerce. The attention of foreign students is called to course 1E.

Elective Courses.—Courses 3A–3B, 4E–4F are open to all students without prerequisite. Courses 110A–110B, and 111A, also may be taken as lower division electives by sophomores who have had course 1.

* Absent on leave, 1917–18.

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INFORMATION FOR UPPER DIVISION STUDENTS

Elective Courses.—The courses listed under the heading Free Electives are open, without any prerequisites, to all students in the upper division. The courses listed as major courses are also open as electives to students in the upper division who have had the prerequisites specified in each case. When no prerequisites are specified the courses are open to upper division students who have passed in course 1A–1B, or Public Speaking 1A–1B.

Systematic Study.—Students who wish to undertake systematic study in the upper division must have completed English 1A–1B, or Public Speaking 1A–1B, and one of the year courses 2, 3, 17, 25. The 12 units of major courses which by university regulation must be chosen from one department, may be made up from any upper division major courses. But all who desire to engage in comprehensive and thorough study, whether for general or professional purposes, should meet the following conditions:

1. Students must present, ordinarily in the first term of the junior year, a programme to be examined and approved by the department. The programme, however, may be amended from time to time after consultation with the department.

2. The programme should cover 24 units of upper division major courses.

3. Of the 24 units, 12 must be in one special field or subject, as for example, Early English, the Drama, Fiction and Essay, Elizabethan Poetry and Prose (inclusive of the Bible), Romantic Movement and Nineteenth Century Poetry and Prose, or the literature of any significant period or movement; or the Theory of Poetry in combination with any field in modern literature.

4. Of the 24 units, 3 must be in a pro-seminar. These may or may not be included in the 12 in the special field.

5. Normally the courses constituting the 24 units should be drawn from the list of courses in English, supplemented by the list of major courses in public speaking; but the department may be willing in exceptional cases to accept, on petition, units from other departments. For example, a student who specializes in fiction might offer certain courses in French or Russian fiction; in the drama, courses in Greek or Latin or French or German drama, etc. Under this head attention is called to Linguistics 101A (Phonetics) and German 210A–210B (English Influences upon German Literature). The 12 units in the special field and the pro-seminar must, however, be in English.

6. The student must pass, at the end of the senior year, English Final Examinations Nos. 1 (History of the Language) and 2 (History of the Literature); but he may be excused from Finals I if he has had either (*a*) 6 units from courses 110–111, or (*b*) 12 units in Latin or Greek or both, of university grade, or (*c*) at least 6 upper division units in one of the following subjects: political science, economics, history, philosophy.

7. At the end of the senior year the student must present, as evidence of powers of research and expression, a thesis written in connection with one of his courses, usually the pro-seminar.

Honor-students in the Upper Division.—A student in the upper division who has received honorable mention with the junior certificate may be registered as a candidate for honors provided 12 of the 48 hours on which the honorable mention was based consist of English 1A–1B, or Public

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Speaking 1A–1B, and one of the year courses 2, 3, 17, 25. To maintain his status he must do at least thoroughly satisfactory (i.e., second grade) work in all of the upper division English courses in which he enrolls. A student who has forfeited his status may, however, regain it by passing at the beginning of the following regular half-year a thoroughly satisfactory special examination in the subject in which he was deficient. No special honor-courses are at present offered by this department, but in certain major courses students who are candidates for honors in English may arrange with the instructor for additional credit, the amount of which will be determined by the instructor after he has outlined with the student the additional work to be done. The assignment, which should be entered on the student's study-card as English 199, will involve not additional class exercises but occasional conferences with the instructor. To be recommended by the department for honors with the bachelor's degree a student must complete with distinction (i.e., with the majority of units in the first grade) all the seven conditions numbered above.

TEACHERS' RECOMMENDATIONS AND HIGHER DEGREES

The department of English issues a separate announcement which contains its requirements for recommendation for the teachers' certificate, and for the degrees of Master of Arts and Doctor of Philosophy.

LOWER DIVISION COURSES

1A–1B. Exercises in the Art of Discourse.

Associate Professor KURTZ (in charge), Assistant Professors SANFORD, CORY, and BRUCE, Mr. MACMINN, Mr. LYMAN, Mr. BOYD, Mr. MONTGOMERY, Dr. CHISLETT, Mr. CLARK, and Mr. SEYMOUR.

Speaking and writing based upon prose models of the various forms of discourse. Course 1A–1B, or Public Speaking 1A–1B, must precede all other courses in English.

3 hrs., throughout the year. Twenty-four sections. M W F, 8, 9, 10, 1, 2, 3, 4; Tu Th S, 8, 9, 10. Also 1B (first half-year), M W F, 10, 1, and Tu Th S, 9; 1A (second half-year), M W F, 8, 9, 10, 1, 2, 3, and Tu Th S, 8.

1C. Oral and Written Reports.

Associate Professor KURTZ, Assistant Professor BRUCE, and Mr. Montgomery.

A course of training adapted to the needs of students in the colleges of applied science and commerce. Students who have taken 1A–1B will not be admitted to this course, but students may proceed from 1C to 1A–1B. Enrollment limited to fifteen in a section.

3 hrs., either half-year. Three sections: I, II, M W F, 8; III, hour to be determined after consultation with students.

*1D. Oral and Written Reports. Mr. ———.

Continuation of Course 1C; enrollment limited to fifteen.

3 hrs., second half-year. M W F, 9. Prerequisite: at least second grade in Course 1C.

* To be given, 1918–19.

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1E. Oral and Written English for Foreigners. Mr. SEYMOUR.

Training in speaking and writing English. Special attention will be paid to pronunciation, grammatical construction, and the idiom of the language. To enter this course students must first obtain the consent of the instructor. Enrollment limited to twenty.

3 hrs., either half-year. M W F, 2.

2A–2B. History of English Literature. Associate Professor ARMES.

For scope of lectures see course 102A–102B.

3 hrs., throughout the year. M W F, 8. Preceptorial sections, 1 hour a week, to be arranged.

17E–17F. Shakespeare and his England. Professor GAYLEY.

For scope of lectures see course 117E–117F.

3 hrs., throughout the year. M W F, 2. Preceptorial sections, 1 hour a week, to be arranged.

25A–25B. Studies in the History of Story-Telling. Associate Professor HART.

For scope of lectures see course 125A–125B.

3 hrs., throughout the year. M W F, 10. Preceptorial sections, one hour a week, to be arranged.

FREE ELECTIVES IN EITHER DIVISION

3A–3B. Introduction to the Study of Poetry. Associate Professor KURTZ.

This course is designed to afford an historical perspective of European poetry and an introduction to the principles of criticism. It is offered both for those who desire a general acquaintance with poetry and for those who intend to select a European literature as a major. Lectures, reading of masterpieces in translation, frequent examinations.

3 hrs., throughout the year. M W F, 1.

4E–4F. Great Books. Professor GAYLEY and a Reader.

A discussion of masterpieces, English and foreign. Lectures, reading, and reports. The course is given in series, each of which may be taken once. Subject for 1917–18: Books about the war.

1 hr., throughout the year. F, 4. In the first half of the year this course is open to all students. In the second half it is limited to students in the colleges of applied science and commerce, and such others as have the permission of the instructor.

6B. Introduction to Narrative Writing. Mr. MACMINN and Mr. BOYD.

Practice in the simpler forms of description and of personal and impersonal narration; with analysis of masterpieces. Enrollment limited to fifteen in a section.

3 hrs., second half-year. M W F, 2. Prerequisite: course 1 and the consent of the instructors.

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*7A. Advanced Exposition, Oral and Written.
Associate Professor KURTZ.

Continuation of Course 1A–1B; preparation of theses with special reference to the methods of logical analysis and arrangement. Enrollment limited to fifteen.

3 hrs., first half-year. M W F, 10. Prerequisite: at least second grade in Course 1A–1B.

UPPER DIVISION COURSES

FREE ELECTIVE COURSES

*10E. English Verse. Mr. BACON.

The history and technique of one or more of the principal kinds, with frequent practice in composition.

3 hrs., either half-year. Tu Th, 2, and a third hour by arrangement. Open only to students who have the permission of the instructor.

Public Speaking.

Students are urgently advised to take one or more of the following courses in the department of Public Speaking: 5A–5B, Public Speaking; 107A–107B, Oral Interpretation; 114A–114B, Bible Reading.

Greek Drama.

Course 155, listed under this name in the announcement of the department of Greek, is warmly recommended to students of English drama.

MAJOR COURSES

Composition, Oral and Written

105B. Fundamentals of Critical Writing. Mr. MACMINN.

The more important critical principles in their application to standard English poetry and prose. In 1918, special study of selected dramatists.

3 hrs., second half-year. Tu Th, 3, and a third hour to be arranged.

106B. Frequent Writing.
Assistant Professor BRUCE, Mr. MACMINN, and Mr. BOYD.

For at least six weeks daily one-page exercises; discussions of style; appointments for individual criticism.

3 hrs., either half-year. First half-year, Tu Th, 3, and a third hour; second half-year, Tu Th, 3, and a third hour; M W, 2, and a third hour. Limited to fifteen in a section.

*106E–106F. The Essay. Associate Professor WELLS.

(E). Training in investigation and in presentation, oral and written; fortnightly compositions, and frequent *précis* and short articles. Class-study of a topic of present-day interest as a basis for writing. In 1913–14, American Traits; in 1914–15, Journalism; in 1915–16, the Present-Day Theatre; in 1916–17, the American College. Limited to twenty-four students.

* To be given, 1918–19.

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(F). Essays on Men and Manners. Pro-seminar. Composition, oral and written, based upon a survey of the background of literature as seen in the diaries and letters and in the standard verse and prose of the period selected. In 1916–17, the Elizabethan Age. Limited to twelve students.

3 hrs., throughout the year. M W F, 3. Prerequisite: junior standing and the permission of the instructor.

Principles of Literature: Interpretation and Criticism

*109C. Problems of Literary Criticism. Associate Professor KURTZ.

Pro-seminar. The beginnings of poetry: analysis and classification.

3 hrs., first half-year. M W F, 9. Prerequisite: course 3A–3B.

110C–110D. The History of English Criticism. Assistant Professor CORY.

(C). Pro-seminar. Reading and reports. Masterpieces studied historically by types. The philosophical implications of literary criticism.

(D). Pro-seminar. Thesis writing on the basis of the materials of course 110C.

2 hrs., throughout the year. M W, 11.

History of the Language

Course 110A–110B, as a general survey, is recommended to all serious students of literature. It is also especially adapted to the needs of prospective teachers. Courses 111A, 111B, 111C, and 111D form a sequence dealing with the language and literature down to 1400. Although the work in these courses is, of necessity, largely linguistic, it is concerned also with the literature as such, and aims to study the masterpieces read as literary types and in connection with the life of the times that produced them. Throughout the sequence there is progressive training in the methods of literary and linguistic research. Course 112A aims to give a general survey of the origin and growth of the language as a basis for an understanding of its present condition.

110A–110B. General Introduction to English Philology. Dr. BRODEUR.

(A). The foundations of English; the literary and linguistic expression of Anglo-Saxon customs and beliefs.

(B). The Norman domination and the resurgence of native manners and speech. English from the Conquest to the present day. The evolution of forms, sounds, and meanings.

3 hrs., throughout the year. M W F, 8. Prerequisite: some acquaintance with Latin or German.

111A. Old English. Dr. BRODEUR.

3 hrs., either half-year. Two sections: M W F, 9, 2.

111B. Beowulf. Dr. BRODEUR.

Pro-seminar.

3 hrs., second half-year. M W F, 9. Prerequisite: course 110A or 111A.

* To be given, 1918–19.

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111c. Middle English: Language and Literature of the 13th Century. Associate Professor Hart.
Pro-seminar.
3 hrs., first half-year. M W F, 9. Prerequisite: course 110a or 111a.

111d. Middle English: Chaucer and his Contemporaries. Associate Professor Hart.
Pro-seminar.
3 hrs., second half-year. M W F, 9.

112a. History of the English Language. Dr. Brodeur.
3 hrs., first half-year. M W F, 1.

112b. Historical English Grammar. Dr. Brodeur.
3 hrs., second half-year. M W F, 1.

Historical and Critical Study of the Literature

102a–102b. History of English Literature. Associate Professor Armes.
Lectures covering the principal periods, movements, and masterpieces. Special assignments adapted to advanced students.
3 hrs., throughout the year. M W F, 8.

*114a–114b. History of the Drama. Associate Professor Armes.
Lectures and readings, with reports by the students.
(a) From the Beginnings to 1642. (b) From 1642 on.
3 hrs., throughout the year. M W F, 10. Prerequisite: courses 1 and 2. This course alternates with 114c–114d (Studies in the Drama).

114c–114d. Studies in the Drama. Associate Professor Armes.
(c). The Renaissance of the English Drama. Lectures, readings and discussions.
(d). Dramatic Construction: analysis of masterpieces, and application of principles to dramas written by students.
3 hrs., throughout the year. M W F, 10. 114c is prerequisite to 114d.

*115a. Elizabethan Poetry. Assistant Professor Sanford.
The principal poets from Surrey and Wyatt to Dryden; their literary forms, types, sources, and historical development. Lectures, reports, and assigned reading.
3 hrs., first half-year. M W F, 10. Prerequisite: courses 1 and 2.

*115b. Spenser. Assistant Professor Sanford.
3 hrs., second half-year. M W F, 10.

*116a–116b. The Bible in English Literature. Professor Gayley and a Reader.
Literary types; qualities of thought and style; careful study of selected books. Lectures, reports, and frequent examinations.
3 hrs., throughout the year. M W F, 2.

* To be given, 1918–19.

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*117C–117D. Shakespeare. Associate Professor HART.

The reading and interpretation of the plays in the following series: (A) *Hamlet, Richard II, The Tempest;* (B) *Lear, 1 Henry IV, Twelfth Night;* (C) *Macbeth, 2 Henry IV, All's Well;* (D) *Othello, Much Ado, Winter's Tale.*

Each series may be taken once. Not to be given in 1917–18. In 1918–19 series (C) will be given the first half-year, and series (D) the second half-year.

3 hrs., throughout the year. M W F, 10.

117E–117F. Shakespeare and his England. Professor GAYLEY.

Lectures. A presentation of the life, customs, and ideals of Shakespeare's age, based upon the study of a number of his plays and some of the works of his contemporaries. Special assignments adapted to advanced students.

3 hrs., throughout the year. M W F, 2.

119A. The Age of Dryden. Assistant Professor SANFORD.

Pro-seminar. A detailed and intensive study of the literature of the Restoration, exclusive of the drama.

3 hrs., first half-year. M W F, 10.

119B. The Ages of Pope and Johnson. Assistant Professor SANFORD.

The poetry of the eighteenth century from the death of Dryden to the French Revolution. Lectures, reports, and assigned reading.

3 hrs., second half-year. M W F, 10.

121A–121B. General History of Nineteenth Century Poetry. Assistant Professor SANFORD.

Lectures; reports on assigned reading.

3 hrs., throughout the year. M W F, 9.

121E–121F. Victorian Prose. Professor GAYLEY.

Pro-seminar. Intensive study of selected masterpieces dealing with problems of critical, philosophical, and political thought. Topics assigned for investigation. Theses and oral discussions. Open to seniors whose major is English, and who are taking one of the instructor's major lecture courses. Also to those who take it as Oral Debates upon Literary Topics as a sequel to Public Speaking 110A–110B. Limited to twenty students.

3 hrs., throughout the year. W, 4–6, and a third hour by arrangement.

122. Browning. Assistant Professor SANFORD.

A systematic study of the complete poetical works of Browning. Lectures and interpretations. Open only to students in the Upper Division and to graduates.

3 hrs., second half-year. M W F, 2.

* To be given, 1918–19.

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123B. Representative Essayists. Assistant Professor BRUCE.

Pro-seminar, 1917–18: Carlyle.

3 hrs., second half-year. Tu Th, 4, and a third hour to be arranged.

124B. Shelley, Keats, and Tennyson. Associate Professor KURTZ.

Pro-seminar. An intensive study of selected poems.

3 hrs., second half-year. M W F, 9.

125A–125B. The Development of the Narrative Art.
Associate Professor HART.

Lectures. (A) The types of briefer narrative; (B) Medieval romance. Special assignments adapted to advanced students.

3 hrs., throughout the year. M W F, 10.

126A–126B. The Classical Influence in English Literature. Dr. CHISLETT.

Lectures and assigned readings. (A) The Nineteenth Century. (B) From the Beginnings to the Nineteenth Century.

2 hrs., throughout the year. Tu Th, 2.

127. The Anglo-Celtic Poets. Mr. LYMAN.

The poets of the so-called Celtic Renaissance, centering in Yeats and the modern school of Irish writers, with an investigation of their background in Old-Irish literature. Lectures, readings, and reports.

3 hrs., first half-year. Tu, 2; Th, 2–4.

American Literature

130. The General History of American Literature.
Associate Professor ARMES.

A general review, illustrated by copious reading; lectures, reports, discussions, and papers. Introductory to course 131, and to course 249 (Californian Literature).

3 hrs., first half-year. M W F, 9. Prerequisite: courses 1 and 2.

131. American Authors. Associate Professor ARMES.

Pro-seminar. Each student will make an intensive study of practically all the work of one of the more important American authors, and present papers thereon for class discussion. The course may be taken as many times as a different author is studied.

3 hrs., second half-year. M W F, 9. Prerequisite: course 130.

199. Assignments for Honors.

In certain major courses candidates for honors may arrange with the instructor to undertake supplementary work for additional credit. For particulars, see above, *Honor-students in the Upper Division.*

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GRADUATE COURSES

Graduates electing these courses must have a reading knowledge of French or German.

231. Philological Seminar. Dr. BRODEUR.

3 hrs., second half-year, to be arranged.

*240A–240B. Seminar in Literary Criticism. Professor GAYLEY.

From a study at first hand of the principal authorities.

3 hrs., throughout the year. M, 4–6. This course must be preceded by course 109 or 110.

241A–241B. Seminar in Literary Investigation. Professor GAYLEY.

Studies in the history of English comedy.

3 hrs., throughout the year. M, 4–6, and a third hour by arrangement. Open only to candidates for higher degrees.

242. Seminar in the Comparative Study of Literature. Associate Professor HART.

Subject to be announced.

3 hrs., throughout the year. M, 2–4, and a third hour by arrangement.

243A–243B. Liberalism in Modern English Prose. Assistant Professor CORY.

Seminar. Historical and comparative study of selected masterpieces by Hooker, Bacon, Locke, Hume, Adam Smith, Huxley.

3 hrs., throughout the year. F, 4–6, and a third hour by arrangement.

244A–244B. Seminar in the Romantic Movement. Assistant Professor SANFORD.

The romantic literature from Chatterton to Morris, with incidental reference to the parallel movement on the Continent. A critical and historical study of romantic writers from Chatterton to Scott (first half-year); from Scott to Morris (second half-year).

3 hrs., throughout the year. M W, 11; F, 1. As preparation for this course, students are advised to take courses 115B, 119A, 119B. In 1918–19 the subject will be the naturalistic development from Thomson to Alfred Noyes.

249A–249B. Seminar in the Development of Californian Literature. Associate Professor ARMES.

Investigation, reports, discussions, and papers. Open only to graduates who have had course 130 or its equivalent.

3 hrs., throughout the year. Th, 9–12.

*To be given, 1918–19.

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*250. Seminar in the Theory of Fiction. Associate Professor WELLS.

The structure of the novel and the aesthetics of fiction; investigation of selected types and of special authors.

3 hrs., throughout the year. Tu Th, 4–5:30.

253. Teaching of English in Secondary Schools. Miss BRECK.

3 hrs., either half-year. Tu Th, 2–4. Required of candidates for the teacher's recommendation with English as a major. Primarily for graduates, but open to seniors who have the consent of the instructor. This course may not be counted towards the graduate credit required for the teacher's recommendation or the master's degree.

260A–260B. Special Study.

The instructors in English hold themselves ready to assist and advise competent students who may propose plans of special study which meet the approval of the department.

*To be given, 1918–19.

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GEOGRAPHY

RULIFF S. HOLWAY, M.S., Associate Professor of Physical Geography.
BURTON M. VARNEY, M.A., Instructor in Geography.

Honor-students in the Upper Division.—Candidates for honors in geography must take course 103 or 118 in the senior year. Not more than 8 units of related work in other departments may be counted as an integral part of an approved plan of work. A summer field course in physiography is recommended.

Courses 1B and 1C are the usual prerequisites for upper division work. Either may be taken without prerequisite, but course 1A is a desirable introduction. Geology 106 should be taken preferably in the sophomore year.

LOWER DIVISION COURSES

1A. Fundamentals of Modern Geography.
Associate Professor HOLWAY and Mr. VARNEY.

Scope and problems of modern geography. Present polar exploration as a type of a great problem nearing completion, the scientific investigation and mapping of the elements of geographic environment, a great problem of the present. Maps, the technical language of geography; properties and uses of map projections. Geographic elements; land forms, water forms, climate, organic life. Influence of geographic environment on man and his affairs. Major geographic conditions of each continent. Geographic control of production and of trade routes. Designed primarily to meet the needs of students in the College of Commerce.

3 hrs., first half-year. M W and alt. F, 10. Map work and recitations, five sections: I, W, 1–3; II, W, 3–5; III, Th, 1–3; IV, Th, 3–5; V, F, 1–3.

Introduction to Economic Geography. [Economics 3A.]

The relations between geography and economics.

3 hrs., second half-year. M W F, 10. Prerequisite: Geography 1A.

1B. Elementary Meteorology. Mr. VARNEY.

The study of weather. The weather elements and controls of weather. Temperature, pressure, and general winds of the world. Storms and the principles of forecasting. The principal types of climate.

3 hrs., second half-year; 3 units. Lectures, M W and alternate F, 8. Laboratory work in five sections: I, M, 1–3; II, Tu, 10–12; III, Tu, 1–3; IV, Th, 1–3; V, Th, 3–5.

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1c. Elementary Physiography. Associate Professor HOLWAY.

An introduction to the study of land-forms. Crustal movements and the resulting initial land-forms. Volcanoes and lava flows. Erosional forces and the processes of degradation. Classification of land-forms. The evolution of topography in a geographic cycle under humid, arid, or glacial conditions. Not open to students who have taken course 1A prior to 1916.

3 hrs., first half-year. M W and alternate F, 8. Laboratory, four sections: I, M, 1–3; II, M, 3–5; III, Tu, 1–3; IV, Tu, 3–5.

UPPER DIVISION COURSES

MAJOR COURSES

102. Field Physiography. Associate Professor HOLWAY.

The topography in the vicinity of San Francisco Bay. The observation and interpretation of topographic forms.

3 units, first half-year; eight field days. Agreed Saturdays and one trip, Th to S, inclusive. Lectures, Tu Th, 2. Prerequisite: elementary physiography or geology. Traveling expenses may amount to $15. Prescribed for the major in physical geography.

103. Special Field Studies. Associate Professor HOLWAY.

Additional field investigation under direct supervision of the instructor in charge, either during the academic year or as intersession work. Open to qualified students by special permission, 1 to 4 units, to be arranged.

113. Climatology. Mr. VARNEY.

The broader aspects of climate, and a consideration of the conditions responsible for the diversity in character of various climates. The climatic features of the western United States, and the factors governing the climates of the different regions.

3 hrs., first half-year. M W F, 9. Prerequisite: course 1B.

*114. Oceanography.

The ocean and the oceanic circulation in their geographic relations. Tides and ocean currents; the use of maps and charts in navigation; trade routes and their significance.

3 hrs., first half-year. Tu Th S, 8. Prerequisite: course 1B and Astronomy 1 and 2A.

115. Physiography of California. Associate Professor HOLWAY.

The physical features of California, with particular reference to the causes and processes involved in the evolution of topographic forms.

3 hrs., second half-year: 3 units. M W alt. F, 9, and two hours laboratory work to be arranged. Prerequisite: elementary physiography.

* Not to be given, 1917–18.

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116A. Geography of the Americas: North America. Mr. VARNEY.

Lectures, with reading of selected references, on the physiography, climate, and the political, economic, and commercial geography of North America, with special emphasis on the United States.

2 hrs., first half-year. M W, 11. Prerequisite: course 1A or 1B.

116C. Geography of Europe. Mr. VARNEY.

Lectures, with references to reading in descriptive publications, on the topography and climate of Europe as a continent; the political, economic, and commercial status of the constituent countries.

2 hrs., second half-year. M W, 11. Prerequisite: course 1A or 1B.

117. Relief Modeling. Mr. VARNEY.

Laboratory work in making relief models.

Either half-year. The consent of the instructor must be obtained before enrollment. Normally 1 unit of credit.

118. Advanced Physiography. Associate Professor HOLWAY.

Recent physiographic publications and the principles controlling the evolution of topography.

3 hrs., second half-year. M W F, 10. Prerequisite: courses 102 and 115. Prescribed for seniors taking physical geography as a major subject.

119. Advanced Physiography. Associate Professor HOLWAY.

Special assignments and the preparation of a thesis in connection with course 118. Hours and credit to be arranged.

GRADUATE COURSES

219. Research. Associate Professor HOLWAY.

Students who register for field work should have at least two days free each week or, preferably, should register for summer work. This course may also include library study in collating geographical data from scientific reports of Pacific Coast work in geology, botany, irrigation, and other allied subjects.

Not less than 2 units each half-year. W, 3–5.

220. The Teaching of Physical Geography. Associate Professor HOLWAY.

The teaching of physical geography in secondary schools, with a study of recent text-books, laboratory manuals, and laboratory and field work. Particular attention is given to the selection from the elementary sciences of experimental and observational work that is fundamental to the appreciation of geographic processes and relations. The plan of work is based upon the customary assignment of physical geography to the first year of the high school.

4 hrs., second half-year; 2 units. Tu Th, 3–5.

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The opportunity for research work in the physical geography of California is almost unlimited. No state in the Union has a greater variety of topographical forms and as yet practically nothing but the most general study of these forms has been made. Within a short distance of the University the coast line topography is most striking and many special problems in connection with ocean terraces and sea-cliff erosion will yield valuable results. Peculiarities of drainage, fault zone topography, and remnants of former geographic cycles are almost at our doors. Within the limits of the state, problems varying from the study of living glaciers to the erosion conditions of the most arid deserts are available for investigation by qualified students. The meteorology and climatology of the state also offer abundant work for original observations, and the extensive data collected by the Weather Bureau may be used for study in this field.

In addition to the field work suggested above, there is need for extensive research in the University Library in order that geographical data scattered throughout the various scientific reports on the geology, botany, water supply, etc., of the coast may be gathered and made available in connection with direct geographic surveys.

Opportunities are by no means confined to physical geography, for problems of equal interest in commercial geography are multiplying with the rapid growth of the coast cities and with the transportation changes under modern conditions.

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GEOLOGY AND MINERALOGY

ANDREW C. LAWSON, Ph.D., Professor of Mineralogy and Geology, and Dean of the College of Mining.

JOHN C. MERRIAM, Ph.D., Professor of Palaeontology and Historical Geology.

GEORGE D. LOUDERBACK, Ph.D., Professor of Geology.

ARTHUR S. EAKLE, Ph.D., Associate Professor of Mineralogy.

ELMER F. DAVIS, Ph.D., Instructor in Mineralogy and Geology.

Honor-students in the Upper Division.—The programmes of honor-students, must be approved by the department not later than the beginning of the senior year. All such programmes must include Geology 102A–102B and Geology 112, or Mineralogy 106A–106B. Honors will be awarded on the basis of excellence in the major.

GEOLOGY

There are no laboratory deposits in this department.

LOWER DIVISION COURSES

1A. General Geology: Dynamical and Structural. Professor LAWSON. Lectures.

3 hrs., first half-year. M W F, 9. Prerequisite: elementary chemistry and physics.

NOTE.—Students who intend to make geology a major study in the later years of their course are advised to take this course as early as possible.

1B. General Geology: Historical. Professor MERRIAM. Lectures.

2 hrs., second half-year. Tu Th, 10. Prerequisite: course 1A or Palaeontology 1.

UPPER DIVISION COURSES

102A–102B. Field Geology. Professor LOUDERBACK.

An inquiry by the student into the geological conditions which obtain in the region around the Bay of San Francisco, with occasional more extended excursions to points of special interest; training in methods of field observation and in interpretation of results.

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Year course; 2 units each half-year; at least fifteen field days during the year. Credit in this course is given only to students who take the year's work, but supplementary credit may be given at the rate of one unit for eight days additional field work. Concurrently with the field work the class meets for lectures, exercises in geological mapping, discussion of methods, interpretation of observations and reading of geological maps. Prerequisite: Geology 1A and Mineralogy 1A. Students taking this course may be called upon to make excursions entailing an outlay for traveling expenses of $25.

Saturdays.

102C. Economic Geology. Metalliferous Deposits. Professor LAWSON.

Lectures.

3 hrs., second half-year. M W F, 10. Prerequisite: course 1A and Mineralogy 1A, 1B.

102D. Economic Geology. Non-metalliferous Deposits. Professor LAWSON.

2 hrs., first half-year. Tu Th, 9. Prerequisite: course 1A and Mineralogy 1A, 1B.

103AB. Introduction to Petrology. Professor LOUDERBACK.

(A) The general characteristics, origin, mode of occurrence, and nomenclature of rocks and description of the more common types.

(B) Laboratory practice in the determination of textures, mineral components, and systematic position of rocks by direct observation of hand specimens.

5 hrs., first half-year; 3 units. Lectures, M W, 10; laboratory, two sections: I, W, 1–4; II, Th, 1–4. Prerequisite: Mineralogy 1A and 2A, 2B.

104A. Petrographical Laboratory. Dr. DAVIS.

The optical properties of crystals and methods of investigation by means of the polarizing microscope. Laboratory and lectures.

7 hrs., first half-year; 3 units. Tu, 11; Th F, 1–4. Prerequisite: Mineralogy 2A, 2B.

104B. Petrographical Laboratory. Professor LOUDERBACK.

Study of rocks with the aid of the microscope. A general introduction to practical petrology. Laboratory and lectures.

6 hrs., second half-year; 2 units. Th F, 1–4. Prerequisite: courses 103AB and 104A.

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107. Physical Geology of North America. Professor LAWSON.

Lectures.

2 hrs., second half-year. Tu Th, 4. Prerequisite: course 1A and Mineralogy 1A, 1B.

106. Practical Work in Palaeontological Geology.
Professor MERRIAM and Dr. CLARK.

Given in connection with course 1B. Laboratory work and excursions. For the purpose of studying a representative series of the geological horizons and of the fossils of the Coast Ranges in the field, seven excursions to points of interest near Berkeley are made on convenient Saturdays during the term.

4 hrs., second half-year; 2 units (1 unit laboratory; 1 unit excursion). Open to students who have completed or are taking course 1B.

112. Undergraduate Thesis Course.

The investigation of a problem individually chosen, with a formal report on the results. An introduction to independent research. If the subject chosen is properly approved, the completion of this course fulfills the thesis requirement for the degree of B.S. in the College of Mining. Admission to this course, hours, and subject matter must be individually arranged with the instructor under whom the student chooses to do the work.

Year course; 2 units each half-year. Credit in this course is given only to students who take the year's work.

114. Earthquakes; an Introduction to Seismology. Dr. DAVIS.

The phenomena of earthquakes in relation to physical and geological principles involved in their causation and in the methods of their investigation. Lectures.

2 hrs., first half-year. M W, 11. Prerequisite: elementary physics and course 1A or its equivalent.

115. Instrumental Seismology. Dr. DAVIS.

Instrumental methods of investigating earthquakes. The care and operation of seismographs with practice in the routine work of a seismographic station. The principal types of instruments employed for earthquake registration.

2 units; hours to be arranged. Prerequisite: course 114.

116. Tectonic Geology. Dr. DAVIS.

The phenomena of folding and faulting. Graphic solution of fault problems.

2 hrs., second half-year. Tu Th, 8. Prerequisite: a working knowledge of descriptive geometry and courses 1A and 102A–102B.

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GRADUATE COURSES

210. Inorganic Geology. Professor LAWSON.

Discussions of special topics and advanced problems. Critical reviews of current literature. Prosecution of original geological research and publication of results.

209. Geology of California. Professor LOUDERBACK.

(A) From the earliest times to the opening of the Tertiary.

*(B) From the post-Jurassic revolution to the present time.

Lectures outlining the geological history of sedimentation, volcanic activity, the major earth movements, and geographical changes in California and bordering territory. Reviews of the literature, discussions of evidence, and field methods. Map studies and preparation of reports.

2 hrs., second half-year. M W, 11 (hours may be changed to suit class). Open to graduates and seniors who have completed course 1A and either course 1B or 107. A course dealing practically with rocks or rock formations, such as 102A–102B or 103AB, is a very desirable preliminary.

214A–214B. Advanced Laboratory and Field Work. Professor LOUDERBACK.

One or more of the following lines may be pursued: (*a*) Special methods—isolation of rock constituents, study of minerals in grains, special optical and other physical methods, chemical and microchemical testing. (*b*) Systematic study of a wide range of rock types with references to literature, and critical discussions. (*c*) Special study of rocks of selected provinces with their geographical and petrological relations. (*d*) Applications of petrographical methods of study of vein and ore minerals, opaque minerals, alteration products, metasomatosis, etc. (*e*) Research. Descriptive, genetic and experimental problems. Combined field and laboratory studies. (*f*) Seminar in petrographic geology. The general topic for 1913–14 was the petrology of igneous rocks; for 1914–15, the natural history of igneous rocks; for 1916–17, contact metamorphism.

Throughout the year. Credit value to be fixed in each case.

* Not to be given, 1917–18.

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MINERALOGY

LOWER DIVISION COURSES

1A. Determinative Mineralogy. Associate Professor EAKLE.

Practice in determination of minerals by their physical properties.

6 hrs., first half-year; 2 units. Sec. I, M F, 1–4; Sec. II, Tu Th, 9–12. Prerequisite: matriculation chemistry. Deposit, $2.50.

1B. Determinative Mineralogy. Associate Professor EAKLE.

Practice in the determination of minerals by use of the blowpipe and chemical reagents.

6 hrs., second half-year; 2 units. Sec. 1, M W, 1–4; Sec. II, Tu Th, 9–12. Prerequisite: matriculation chemistry. Deposit, $2.50.

2A. Crystallography. Associate Professor EAKLE.

Lectures on the morphology of crystals.

2 hrs., second half-year. M W, 9.

2B. Crystallographical Laboratory. Associate Professor EAKLE.

Practice in the determination of the forms of crystals and in the methods of crystal projections. May be taken only in conjunction with course 2A and is required of all students taking that course.

2 hrs., second half-year; 1 unit. Sec. I, F, 1–3; Sec. II, Th, 1–3.

UPPER DIVISION COURSES

102C. Physical Mineralogy. Associate Professor EAKLE.

Lectures on the physical properties of crystals.

1 hr., first half-year. F, 9. Prerequisite: courses 1A, 1B, 2A, 2B.

103. Descriptive Mineralogy. Associate Professor EAKLE.

The classification, properties, modes of occurrence, and uses of minerals. Lectures and laboratory practice for the study and discussion of minerals.

2 hrs., second half-year. Lectures, M W, 11; laboratory hours to be arranged. Prerequisite: courses 1A, 1B, 2A, 2B.

*104. Gems and Precious Stones. Associate Professor EAKLE.

Lectures on the kinds and properties of gem minerals, their occurrences and history. Courses 104 and 105 are given alternately.

2 hrs., first half-year. M W, 11.

* Not to be given, 1917–18.

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105. Paragenesis of Minerals. Associate Professor EAKLE.

Lectures on mineral formation, associations, and synthetic production. Courses 104 and 105 are given alternately.

2 hrs., first half-year. M W, 11.

106A–106B. Undergraduate Thesis Course.

The investigation of a problem individually chosen, with a formal report on the results. An introduction to independent research. If the subject chosen is properly approved, the completion of this course fulfills the thesis requirement for the degree of B.S. in the College of Mining. Hours, subject matter and admission to the course must be arranged individually with the instructor under whom the student chooses to do his work. Required of undergraduates electing a major in mineralogy.

Year course; 2 units each half-year.

107. Mineralogical Laboratory. Associate Professor EAKLE.

One or more of the following lines of study may be pursued: (*a*) Systematic study of selected suites of minerals. (*b*) Practice in measuring and drawing crystals. (*c*) Practice in the quantitative analyses of minerals. Admission to the course by individual arrangement. Credit to be based on the character of the work done. Prerequisite: course 103.

GRADUATE COURSES

In physical and chemical mineralogy, little has been done with the minerals of California, and the University collections contain an abundance of material suitable for work in these fields.

To the student who wishes to devote his attention to the genesis of minerals, their associations and their occurrences, this state offers exceptional advantages. The mineralogy of California is very incompletely known and few mineral deposits have been described. There are numerous contact zones, pegmatitic dikes, veins, and dry lake deposits, all possessing a varied assortment of minerals, which afford attractive problems for investigation.

207. Advanced Crystallography. Associate Professor EAKLE.

This course includes practical work in the measurement of crystals, the calculation of forms and the various methods of graphical representation.

208. Advanced Mineralogy. Associate Professor EAKLE.

In this course the student is given the opportunity to obtain a wider and more thorough knowledge of minerals than is possible in the undergraduate courses. Qualified undergraduates may be admitted to the course. Subjects for theses may be chosen in either of the courses 207 or 208.

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GERMAN

HUGO K. SCHILLING, Ph.D., Professor of the German Language and Literature.

ALBIN PUTZKER, M.A., Professor of German Literature, Emeritus.

J. HENRY SENGER, Ph.D., Professor of German, Emeritus.

HERMANN J. WEBER, Ph.D., Associate Professor of German.

LUDWIG J. DEMETER, M.A., Assistant Professor of German.

CLARENCE PASCHALL, M.A., Associate Professor of German.

CLAIR HADYN BELL, M.L., Instructor in German.

FRANZ SCHNEIDER, Ph.D., Instructor in German.

LAWRENCE M. PRICE, Ph.D., Instructor in German.

KURT HELLER, Ph.D., Instructor in German.

C. F. HAMFF, M.A., Instructor in German.

ALICE P. TABOR, Ph.D., Instructor in German.

ALFRED H. SCHMIDT, M.A., Assistant in German.

HENRY S. KING, A.B., Teaching Fellow in German.

Students who wish to make a special study of German literature are advised to acquire a reading knowledge of French and a general knowledge of German history, of the History of Philosophy (Philosophy 103A–103B), and of the Study of Poetry (English 3A–3B). In the philological courses some knowledge of Greek is highly desirable.

Honor-students in the Upper Division.—Upper division students who have completed with high standing courses AB, CD, EF, or their equivalent, and who have received the junior certificate with honorable mention, or who have the recommendation of the department, may be admitted, on application to the secretary of the department, to candidacy for honors. Such candidates will be required to complete with high standing an approved programme of courses including, normally, 24 units of upper division work in German. The department does not prescribe any definite programme, but it will, as a rule, insist upon a good practical command of the language, and a general knowledge of German literature. To this end, course 118A–118B will constitute a part of each programme, and likewise, unless these courses shall have been taken already in the lower division, courses 106A–106B and 106C–106D. In the case of candidates who are already well advanced in German and whose plan of study makes it desirable for them to take certain courses in allied departments, permission may be given to count such courses in partial satisfaction of the 24 units required for the major.

It is very important that students in the lower division who have had German in the high school and who are looking forward to specializing in the language and to possible candidacy for honors shall not discontinue the study for a time, intending to resume it later. This always involves a serious loss which it is difficult to make good.

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LOWER DIVISION COURSES

AB. Elementary German.

Associate Professor PASCHALL (in charge), Mr. BELL, Dr. PRICE, Mr. HAMFF, Dr. TABOR, Mr. SCHMIDT, and Mr. ——.

5 hrs., either half-year. First half-year: M Tu W Th F, 8, 9, 10, 1; second half-year: M Tu W Th F, 8, 9, 10. The course corresponds to matriculation subject 15*b*[2].

CD. Elementary German (continuation of AB).

Associate Professor PASCHALL (in charge), Mr. BELL, Dr. SCHNEIDER, Dr. PRICE, Mr. HAMFF, Dr. TABOR, Mr. SCHMIDT, and Mr. KING.

5 hrs., either half-year. M Tu W Th F, 8, 9, 10, 1. The course corresponds to matriculation subject 15*b*[3].

E–F. Intermediate German.

Associate Professor WEBER (in charge), Dr. PRICE, Mr. HAMFF, Dr. TABOR, and Mr. SCHMIDT.

Selections from prose and poetry, ordinarily including one of Schiller's dramas; grammar and composition. The course is conducted mainly in German. It corresponds to matriculation subject 15*b*[4].

3 hrs., throughout the year. First half-year: M W F, 8, 9, 1, 2; second half-year, M W F, 8, 9, 1. Prerequisite: course CD or credit in matriculation subject 15*b*[3].

EF. Intermediate German (continuation of CD of first half-year).

Mr. BELL, Dr. SCHNEIDER, Dr. HELLER, Mr. HAMFF, and Mr. SCHMIDT.

5 hrs., second half-year. M Tu W Th F, 8, 9, 10. Identical, in scope and subject matter, with course E–F.

3A–3B. Introduction to Technical Reading. Dr. TABOR and Mr. KING.

Subjects in history, political science, economics, and the natural sciences. If the enrollment warrants it, there will be separate sections for students in the College of Chemistry and for pre-medical students.

3 hrs., throughout the year. M W F, 8, 1. Prerequisite: course CD or credit in matriculation subject 15*b*[3].

Course 3A–3B provides special training in the reading of more or less technical texts. The regular courses leading to the upper division courses in German are E–F and EF. Students who have had course 3A–3B may, however, take course 106A–106B or course 107A–107B; and they may be admitted to courses 104A–104B and 105A–105B, if they take at the same time course 106A–106B, or satisfy the department that they are not deficient in grammar and composition.

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FREE ELECTIVE COURSE

9A–9B. Outlines of the History of German Literature.
Associate Professor WEBER.

Lectures (in English) and collateral reading of representative works (in English translations).

1 hr., throughout the year. Tu, 11.

This course is open to students in all departments of the University, as a free elective, and does not require a knowledge of German. It is not intended for those who pursue the study of German beyond course 105A–105B (see course 118A–118B).

UPPER DIVISION COURSES

The courses in this group (except courses 107A–107B, 121B, 121D, and 121F) are conducted in German.

104A–104B. Introduction to Recent Literature.
Dr. SCHNEIDER and Dr. PRICE.

Selected works of Hauptmann, Sudermann, Wildenbruch, and Fulda.

3 hrs., throughout the year. M W F, 10, 1. Prerequisite: course E–F or EF, or credit for matriculation subject 15*b*; or, conditionally, course 3A–3B.

105A–105B. Classics of the Eighteenth Century.
Associate Professor PASCHALL and Mr. BELL.

Selected works of Lessing, Goethe, and Schiller.

3 hrs., throughout the year. M W F, 10, 1. Prerequisite: same as for 104A–104B.

107A–107B. Historical Prose. Dr. TABOR.

Selections from the works of German historians, chosen with the view of giving a general survey of German history and government.

2 hrs., throughout the year. Tu Th, 9. Prerequisite: same as for course 104A–104B (but see also note to course 3A–3B).

106A–106B. Grammar, Composition, and Conversation. First course.
Mr. BELL, Dr. PRICE, Dr. HELLER, Mr. HAMFF, Dr. TABOR and Mr. SCHMIDT.

2 hrs., throughout the year. Tu Th, 11, 1. Prerequisite: same as for course 104A–104B.

106C–106D. Grammar, Composition, and Conversation. Second course.
Assistant Professor DEMETER, Dr. SCHNEIDER, and Dr. HELLER.

2 hrs., throughout the year. Three sections: Tu Th, 10, 11, 3. Prerequisite: first or second grade of scholarship in course 106A–106B.

*106E–106F. Exercises in Conversation and Writing.
Assistant Professor DEMETER.

2 hrs., throughout the year. Tu Th, 11.

This course is supplementary to 106C–106D, and is ordinarily to be taken in connection with that course. Taken alone it does not lead up to 206A–206B. Prerequisite: same as for course 106C–106D.

* Not to be given, 1917–18.

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110A–110B. The German Ballad. Professor SCHILLING.

German ballad poetry from Goethe and Schiller to the present day.

1 hr., throughout the year. Tu, 11. Prerequisite: same as for course 104A–104B.

111A–111B. Novelists of the Nineteenth Century.

Associate Professor WEBER.

Selected novels of Hauff, Freytag, Ludwig, Keller, Meyer, Sudermann, and others.

3 hrs., throughout the year. M W F, 10. Prerequisite: course 104A–104B, 105A–105B, 106A–106B, or 107A–107B.

*113A–113B. The German Folk-Song. Professor SCHILLING.

A study of the history of German folk-poetry from the Middle Ages to the present. Lectures and reading.

1 hr., throughout the year. Th, 3. Prerequisite: course 104A–104B, 105A–105B, 106A–106B, or 107A–107B.

118A–118B. General History of German Literature. Professor SCHILLING.

First half-year, the Middle Ages; second half-year, from the Reformation to the death of Goethe. Lectures and discussions; collateral reading. Not open to lower division students except by special permission of the instructor.

3 hrs., throughout the year. M W F, 2. Prerequisite: course 104A–104B, 105A–105B, or 107A–107B.

119A. Middle High German. Associate Professor PASCHALL.

Outlines of grammar. Selections from the Nibelungenlied, the Kudrun, and the epics of chivalry. Translation into modern German.

3 hrs., first half-year. M W F, 9. Prerequisite: course 104A–104B, 105A–105B, 106A–106B, or 107A–107B. This course should be taken together with or after (but not before) 118A–118B.

121B. Methods of Teaching German. Professor SCHILLING.

1 hr., second half-year. W, 3.

121D. German Phonology and Orthography.

Associate Professor PASCHALL.

1 hr., second half-year. M, 3.

121F. Problems in the Teaching of Grammar.

Associate Professor PASCHALL.

1 hr., second half-year. F, 3.

Courses 121B, D, and F are primarily intended for candidates for the teacher's recommendation and will be accepted in partial satisfaction of the requirement in education for that recommendation.

150A–150B. Special Study.

Topics selected with the approval of the department and studied privately under the direction of one of the instructors. This course is intended primarily for graduate students in absence.

* Not to be given, 1917–18.

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GRADUATE COURSES

Prerequisite: for the literary courses, course 118A–118B; for those in philology, ordinarily courses 119A and 106C–106D.

206A–206B. Composition. Third course. Assistant Professor DEMETER.

Themes and essays. Practice in the correcting of written exercises. One conference a week with each student, at an hour to be appointed by the instructor. 2 units each half-year. Prerequisite: first or second grade of scholarship in course 106C–106D. This course cannot be credited in satisfaction of the requirement of graduate work for the teacher's recommendation or the master's degree unless the student has already completed an equal amount of approved graduate work.

208A–208B. Spanish Influences upon German Literature in the Seventeenth and Eighteenth Centuries. Dr. SCHNEIDER.

1 hr., throughout the year.

210A–210B. English Influences upon German Literature. Dr. PRICE.

First half-year: the Eighteenth Century; second half-year: the Nineteenth Century, with particular reference to the Novel. Study of illustrative works. Preparation of a report on a special topic.

1 hr., throughout the year.

222A–222B. The Faust Legend and Goethe's Faust. Professor SCHILLING.

2 hrs., throughout the year. Tu Th, 2.

*223A–223B. The Poems of Goethe. Professor SCHILLING.

1 hr., throughout the year. Th, 2.

225A–225B. German Literature in the Nineteenth Century. Associate Professor WEBER.

Prose fiction, epic and lyric poetry.

3 hrs., throughout the year. M W Th, 11.

*226A–226B. German Literature in the Nineteenth Century. Associate Professor WEBER.

The drama up to the rise of the naturalistic movement (about 1880).

3 hrs., throughout the year. M W Th, 11.

*230A–230B. The German Drama of the Present Day. Professor SCHILLING.

The drama and the stage from the beginning of the naturalistic movement to the present day.

2 hrs., throughout the year. Tu Th, 2.

* Not to be given, 1917–18.

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227B. Literature and Art in the Middle Ages.
Assistant Professor DEMETER.

The relation of literature, especially of mysticism and the religious drama, to the fine arts in Germany and the Netherlands.

2 hrs., second half-year. Tu Th, 3.

*228B. German Art in the Nineteenth Century in its Relation to the Leading Literary Movements. Assistant Professor DEMETER.

2 hrs., second half-year. Tu Th, 3.

242A–242B. The Lyrics and Prose of Heine and of Mörike. Pro-seminar.
Associate Professor WEBER.

2 hrs., throughout the year. Th, 4–6.

*243A–243B. German Literature in the Sixteenth and Seventeenth Centuries.
Associate Professor WEBER.

2 hrs., throughout the year.

*245A–245B. The "Storm and Stress" in the Eighteenth Century. Pro-seminar. Assistant Professor DEMETER.

1 hr., throughout the year.

246A–246B. The Works of Hebbel. Pro-seminar.
Assistant Professor DEMETER.

2 hrs., throughout the year.

*247B. German Poetry during the Decadence of Chivalry.
Professor SCHILLING.

3 hrs., second half-year.

Introduction to Germanic Philology. [See Germanic Philology 201A.]
Professor SCHILLING.

Gothic: Grammar and Reading. [See Germanic Philology 202B.]

*235B. Old Saxon. Outlines of Germanic Metrics. Professor SCHILLING.

3 hrs., second half-year.

237B. Old High German. Professor SCHILLING.

3 hrs., second half-year.

240A. Historical Grammar of the German Language.
Associate Professor PASCHALL.

2 hrs., first half-year.

*Germanic Antiquities. [See Germanic Philology 205.]
Professor SCHILLING.

250A–250B. Germanic Seminar. Professor SCHILLING.

Original investigation in linguistic and literary fields chosen with regard to the needs and wishes of each student. Tu, 4–6.

* Not to be given, 1917–18.

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GERMANIC PHILOLOGY

For the courses in English and German Philology see the department announcements. The courses in Germanic Philology are open to competent undergraduates, at the discretion of the instructor.

GRADUATE COURSES

201A. Introduction to Germanic Philology. Professor SCHILLING.

The Indo-Germanic race, its history, and the phonology of its principal languages. The Germanic sound-shift and the phonological development of the Germanic dialects.

2 hrs., first half-year.

202B. Gothic. Associate Professor PASCHALL.

Grammar, with special reference to the other Germanic dialects. Reading.

3 hrs., second half-year.

*203A–203B. Old Norse. Associate Professor PASCHALL.

Outlines of the grammar; reading.

2 hrs., throughout the year.

*205. Germanic Antiquities. Professor SCHILLING.

* Not to be given, 1917–18.

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GREEK

ISAAC FLAGG, Ph.D., Professor of Greek, Emeritus.

EDWARD B. CLAPP, Ph.D., LL.D., Professor Emeritus, of the Greek Language and Literature.

GEORGE W. BUNNELL, M.A., Professor of Greek, Emeritus.

[1]FRANCIS G. ALLINSON, Ph.D., Sather Professor of Classical Literature for the first half-year.

[2]WILLIAM K. PRENTICE, Ph.D., Sather Professor of Classical Literature for the second half-year.

JAMES T. ALLEN, Ph.D., Associate Professor of Greek.

IVAN M. LINFORTH, Ph.D., Associate Professor of Greek.

OLIVER M. WASHBURN, A.B., Assistant Professor of Classical Archaeology.

NOTE.—The courses to be given by Professors Allinson and Prentice will be announced later.

Greek studies properly include not only the language of the Greeks, but all the manifestations of their genius in literature, philosophy, art, history, politics and religion. As far as possible the department of Greek, assisted by members of other departments, aims to provide instruction in all these subjects.

The courses which are offered fall into two classes: (*a*) those in which a knowledge of the Greek language is required, including the courses for beginners in Greek; (*b*) those for which a knowledge of Greek is not necessary. But it cannot be too strongly emphasized that a fair knowledge of the language is essential for anything more than a superficial study of the works of the Greeks.

Honor-students in the Upper Division.—A student in the upper division may be registered as a candidate for honors in Greek under the following conditions: (1) he must have finished courses AB, C, D, or their equivalent, and (2) either he must have received honorable mention with the junior certificate, or he must have the recommendation of the department. His work as a candidate will be arranged by himself in consultation with the department in accordance with his special interests and abilities, whether they be literary, historical, philosophical, linguistic, or other. Appropriate courses in other departments will be freely accepted by the Greek department. Course 199 is especially devised for candidates and may consist of any kind of work appropriate for the individual candidate, whether carried on by himself privately, or by conference with instructors, or otherwise. Members of the department hold themselves in readiness to guide and assist candidates in any way whatever.

Honors at graduation will be awarded to those candidates who have shown marked excellence in their work. Normally they will be expected to have taken courses E–F, 3A–3B, 1, 2, 101, 102, and at least two other major courses; but this series of courses is not definitely prescribed.

[1] In residence first half-year only; [2], second half-year only.

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I. COURSES NOT REQUIRING A KNOWLEDGE OF THE GREEK LANGUAGE

LOWER DIVISION COURSES

46. Greek Life from the Monuments. Assistant Professor WASHBURN.
Illustrated lectures on the life of the Greeks.
1 hr., first half-year. Tu, 7 p.m.

49. Centers of Greek Life. Assistant Professor WASHBURN.
Illustrated lectures on Troy, Pergamon, Priene, Miletus, Delphi, Olympia, Herculaneum, etc.
1 hr., second half-year. Tu, 7 p.m.

History of Ancient and Classic Architecture. [Architecture 5A–5B.] Professor HOWARD.

UPPER DIVISION COURSES

*140. Greek Sculpture. Assistant Professor WASHBURN.
An historic study of Greek sculpture to the close of the Hellenistic period.
2 hrs., second half-year.

151A. Greek Religious Institutions. Associate Professor LINFORTH.
2 hrs., first half-year. Tu Th, 11.

151B. Greek Religious and Moral Ideas. Associate Professor LINFORTH.
A study of Greek religious and moral ideas from the beginning to 400 B.C.
2 hrs., second half-year. Tu Th, 11.

153. Greece and the Greeks. Associate Professor ALLEN.
Studies in Greek life and thought from Homer to the Christian era. Lectures, reports, discussions.
2 hrs., first half-year. Tu Th, 2.

155. Greek Drama. Associate Professor ALLEN.
The development, significance and influence of the Greek drama; Aeschylus, Sophocles, Euripides, Aristophanes, Menander. Lectures, readings, reports and discussions.
2 hrs., second half-year. Tu Th, 2.

Problems of Literary Criticism—the Beginnings of Poetry. [English 109C.] Associate Professor KURTZ.

Ancient History to the Death of Alexander. [History 111A.] Assistant Professor SCHOLZ.

Plato. [Philosophy 116.] Assistant Professor POPE.

Theory of the State. [Political Science 101.] Professor ELLIOTT.

* Not to be given, 1917–18.

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II. COURSES REQUIRING A KNOWLEDGE OF THE GREEK LANGUAGE

LOWER DIVISION COURSES

Students who have credit for matriculation subjects 8 and 9 should take courses 1 and 2 in their freshman year. Students who have credit for matriculation subject 8 only should take courses C and D or CD in their freshman year, and courses 1 and 2 in their sophomore year. Students who have no matriculation credit in Greek should take course A–B in their freshman year and courses C and D in their sophomore year, or courses AB, CD in their freshman year.

A–B. Greek for Beginners. —— ——.

An introduction to the Greek language based upon graded selections from the works of Menander, Euclid, Aristophanes, Plato, Herodotus, and the New Testament. The method of presentation emphasizes the living phrase, and has as its chief object the acquiring of reading power. Mastery of essential forms, memorizing of quotations; practice in reading at sight.

3 hrs., throughout the year. M W F, 1.

AB. Greek for Beginners. Associate Professor ALLEN and —— ——.

A double course, covering the work of courses A and B in one half-year.

5 hrs., either half-year. First half-year: M Tu W Th F, 8; second half-year: M Tu W Th F, 9.

C. Attic Prose. Associate Professor ALLEN.

Reading of Attic prose; study of inflectional forms, syntax, vocabulary; exercises both in rapid reading and close analysis.

3 hrs., first half-year. M W F, 10.

D. Introduction to Homer. Associate Professor LINFORTH.

Several books of the Iliad; Homeric forms and vocabulary; intelligent and expressive reading of the verse.

3 hrs., second half-year. M W F, 10.

CD. Attic Prose and Homer. Associate Professor ALLEN.

A double course, covering the work of courses C and D in one half-year.

5 hrs., second half-year. M Tu W Th F, 8.

E–F. Prose Composition, I. —— ——.

Exercises in writing simple Greek sentences, with special attention to elementary matters of grammar: inflection, syntax, and arrangement of words.

1 hr., throughout the year. Tu, 1. Hour subject to change. Prerequisite: matriculation subject 8 or course A–B, or AB.

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1. Socrates. —— ——.

Lectures on the life and times of Socrates; reading of the Apology, Crito, and the close of the Phaedo of Plato, and scenes from the Clouds of Aristophanes.

3 hrs., first half-year. M W F, 9.

2. Greek Poetry. Associate Professor LINFORTH.

Reading of one tragedy and selections from Homer, the lyric poets, and the dramatists. Lectures and assigned readings on the history of Greek Poetry.

3 hrs., second half-year. M W F, 9.

3A–3B. Prose Composition, II. Associate Professor LINFORTH.

Exercises in writing Greek prose, with special attention to the simpler rhetorical principles; particles, balance and antithesis, participles, etc.

1 hr., throughout the year. M, 3. Hour subject to change. Prerequisite: course E–F.

UPPER DIVISION COURSES

Courses 101 and 102 are designed to follow courses 1 and 2, and form the proper introduction to the other major courses in which a knowledge of the Greek language is required. Students who have not had courses 101 and 102 should not elect any of the other courses in the following group without consultation.

101. Historical Prose. —— ——.

Reading of selections from Herodotus and Thucydides which exhibit the rise and fall of the Athenian Empire; training in rapid and intelligent reading of ordinary Greek prose.

3 hrs., first half-year. M W F, 2.

102. Introduction to Greek Drama. —— ——.

Reading of two tragedies and one comedy. Lectures and readings on the technique and presentation of Greek plays.

3 hrs., second half-year. M W F, 2.

*110. Homer. Associate Professor LINFORTH.

3 hrs., first half-year.

*120. Euripides. Associate Professor LINFORTH.

3 hrs., second half-year.

121. Sophocles. Associate Professor LINFORTH.

Reading and interpretation of the extant plays.

3 hrs., first half-year. M W and alternate F, 11.

* Not to be given, 1917–18.

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*122. Aeschylus. Associate Professor ALLEN.
3 hrs., second half-year.

129. Studies in the Attic Orators. Associate Professor ALLEN.
Pro-seminar. A study of life in Athens in the fifth and fourth centuries, as illustrated by the Attic orators.
2 hrs., second half-year; 3 units. Tu Th, 2.

*131. Herodotus. Associate Professor LINFORTH.
3 hrs., second half-year.

*137. Aristophanes. Associate Professor ALLEN.
3 hrs., first half-year.

199A–199B. Special Study. Associate Professor LINFORTH.
Each student will pursue privately some definite course of reading or investigation, and will report at regular intervals to the instructor. Open only to candidates for honors. Credit will be determined for each student (1–4 units).

GRADUATE COURSES

The library, enriched by very large additions during the ten years past, contains practically everything that an advanced student is likely to need. Considerable apparatus for Palaeography and Epigraphy is provided, and the University Museum furnishes a collection of casts of the masterpieces of Greek art, as well as a few originals.

The following courses are intended for graduate students only, and one or more of them will be given each year, according to the needs of students. Many graduate students will find it profitable to take also some of the upper division courses for undergraduates.

255A–255B. Studies in Greek Dramatic Representation.
Associate Professor ALLEN.
A study of the literature of Greek dramatic representation, together with the reading of representative plays of Aeschylus, Sophocles, Euripides, Aristophanes, and Menander. Investigation of special problems.
2 hrs., throughout the year; 4 units each half-year. Tu Th, 3.

*256A–256B. Studies in the Religion of Athens in the Second Half of the Fifth Century, B.C. Associate Professor LINFORTH.

257A–257B. Greek Inscriptions. Assistant Professor WASHBURN.
Practical exercises in the reading and interpretation of inscriptions of philological, archaeological, and historical interest.
2 hrs., throughout the year. Hours to be arranged.

* Not to be given, 1917–18.

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HISTORY

H. Morse Stephens, M.A., Litt.D., Sather Professor of History.

Herbert E. Bolton, Ph.D., Professor of American History and Acting Curator of the Bancroft Library.

[2]Frederick J. Teggart, A.B., Associate Professor of History.

Eugene I. McCormac, Ph.D., Associate Professor of American History.

Louis J. Paetow, Ph.D., Associate Professor of Medieval History.

Richard F. Scholz, Ph.D., Assistant Professor of Ancient History.

William A. Morris, Ph.D., Assistant Professor of English History.

Charles E. Chapman, Ph.D., Assistant Professor of Latin-American and California History.

Herbert I. Priestley, Ph.D., Assistant Professor of History and Assistant Curator of the Bancroft Library.

Karl C. Leebrick, Ph.D., Instructor in History.

Francis W. Rübke, B.S., Assistant in History.

Arthur P. Watts, M.A., Assistant in History.

The attention of students is called to the unusual opportunities for historical research offered by the Bancroft collection of manuscripts and books relating to the countries bordering upon the Pacific Ocean from Alaska to Panama. The results of investigations completed in connection with the work of the department appear in the University of California Publications in History and in the Publications of the Academy of Pacific Coast History.

Honor-students in the Upper Division.—Honors will be conferred only upon students who have completed a 24-unit major in history with distinction. One of the following plans must be chosen.

A. The honor-student must complete course 101A–101B, Honor-course: Historiography, Professor Stephens, 4 units each half-year, with distinction.

B. The honor-student must choose three fields of history (such as ancient history, medieval history, modern European history, English history, history of Spain and Spanish America, American history, and the history of the West). He may read for honors in connection with any courses offered in his chosen fields. Ordinarily, he should begin work in these fields not later than the beginning of his junior year, but he will be allowed to begin as late as the beginning of his senior year. The instructors concerned will be free to make any arrangements they please with honor-students.

At the end of his senior year a candidate for honors may be required to take a special honor examination in each of his three fields. At the time when he takes such examinations he shall be excused from all final examinations in the courses which he is taking in his chosen fields.

[2] In residence second half-year only, 1917–18.

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Not later than December 1 or April 25 preceding graduation a candidate must submit a thesis, presumably one which has grown out of a term paper in one of the courses he has taken in preparation for his honor-examination. The thesis must be typewritten, on pages 8½ × 10 inches, and must be in suitable form.

The three instructors in charge of the candidate's chosen fields of work shall constitute a committee of the department to read the honor-examination papers, to pass upon the merits of the thesis, and, on the basis of this evidence, shall recommend to the department that honors be granted or not granted. Thereupon the department will take final action.

For detailed information, see the Announcement of the Department of History, 1916–17.

LOWER DIVISION COURSES

Students may satisfy any requirement of history for the junior certificate by taking Course 1A–1B. Students who elect history as their major subject in the upper division must take Course 1A–1B, and are recommended to acquire a reading knowledge of French, German, or Spanish in the lower division.

1A–1B. General History.
Professor STEPHENS, Dr. LEEBRICK, and Assistants.

The growth of western civilization from earliest times to the end of the nineteenth century. An introduction to the study of history, affording a general perspective of the development of society, politics, and literature in Europe. No text-book is used, but a syllabus is provided for the contents of eighty lectures, forty to be delivered each term. The first half-year's work extends to the beginning of the thirteenth century, and the second half-year's work from the thirteenth to the nineteenth century. The class is divided into thirty sections in which recitations are conducted weekly by the assistants in history, who also hold conferences with individual students at stated hours in 131 Library. *Course* 1B *is not open to freshmen who have not had course* 1A.

3 hrs., throughout the year. M W F, 10.

2B. Historical Geography. Associate Professor TEGGART.

The relations of habitat and culture. The historical movement of population as influenced by geographical factors. Frontiers and the distribution of political units. Historical changes in the political map of Europe.

3 hrs., second half-year. M W F, 2.

UPPER DIVISION COURSES

FREE ELECTIVE COURSE

91A–91B. History of Europe in the Nineteenth Century, 1815–1914.
Professor STEPHENS.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: upper division standing, or History 1, Political Science 1, or Economics 1.

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MAJOR COURSES

101A–101B. Honor-course: Historiography. Professor STEPHENS.
2 hrs., throughout the year: 4 units each half-year. W, 3–5.

†102A–102B. The Migrations of Peoples. Associate Professor TEGGART.
The origin and significance of the movement of peoples, considered particularly as a factor in the growth of European civilization.
2 hrs., throughout the year. M W, 11.

111A–111B. Ancient History. Assistant Professor SCHOLZ.
(A) To the death of Alexander. (B) To the early seventh century.
3 hrs., throughout the year. M W F, 8. Prerequisite: course 1A–1B and a reading knowledge of French, or German, or Italian.

*112A–112B. Hellenism, its Spread and Transformation.
Assistant Professor SCHOLZ.
(A) Greek civilization from its beginnings to the second century A.D. (B) Byzantine history, from the time of Constantine to the fall of Constantinople (1453).
2 hrs., throughout the year. Tu Th, 8. Prerequisite: course 111A–111B and a reading knowledge of French, or Italian, or German.

*113A–113B. Ancient Imperialism and the Antecedents of the Medieval Empire. Assistant Professor SCHOLZ.
(A) To the death of Julius Caesar. (B) From the Principate of Augustus to Charlemagne.
2 hrs., throughout the year. Tu Th, 8. Prerequisite: course 111A–111B and a reading knowledge of French or German.

114A–114B. The History of Religions to the Sixth Century.
Assistant Professor SCHOLZ.
(A) To Alexander the Great. (B) To Justinian.
2 hrs., throughout the year. Tu Th, 8. Prerequisite: course 111A–111B and a reading knowledge of French or German.

*115A–115B. History of Ancient Law. Assistant Professor SCHOLZ.
Historical background and comparative study of Babylonian, Hebrew, Greek, Hellenistic and Roman law and legal institutions. Especially designed for students of law.
2 hrs., throughout the year, to be arranged.

121A–121B. Medieval History. Associate Professor PAETOW.
A general survey of European history from about 500 to about 1500, based on Paetow, *Guide to the Study of Medieval History*, Part II.
3 hrs., throughout the year. M W F, 9. Prerequisite: course 1A–1B and a reading knowledge of French, or German, or Italian, or Spanish.

* Not to be given, 1917–18. † Not to be given, first half-year.

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122A–122B. Medieval Culture. Associate Professor PAETOW.

From about 500 to about 1300, with special emphasis on the twelfth and thirteenth centuries, based on Paetow, *Guide to the Study of Medieval History*, Part III.

2 hrs., throughout the year. Tu Th, 9. Prerequisite: course 121A–121B and a reading knowledge of French or German.

*123A–123B. Medieval France. Associate Professor PAETOW.

From the Treaty of Verdun to Louis XI. Special emphasis is laid on the history of institutions: (A) Feudal institutions; (B) Monarchial institutions.

2 hrs., throughout the year. Tu Th, 9. Prerequisite: course 121A–121B and a reading knowledge of French.

*131A–131B. Renaissance and Reformation.

3 hrs., throughout the year.

141A–141B. Modern European History. Dr. LEEBRICK.

Lectures on the history of Europe from 1600 to 1890, based on Stephens, *Syllabus of a Course of Lectures on European History.*

3 hrs., throughout the year. M W F, 2. Prerequisite: course 1A–1B and a reading knowledge of French, or German, or Italian, or Spanish.

*142A–142B. The French Revolutionary Period in Europe. Professor STEPHENS.

An intensive study of the French Revolution from 1789 to 1799, and its influence on Europe.

2 hrs., throughout the year. Tu Th, 2. Prerequisite: course 141A–141B and a reading knowledge of French.

143A–143B. The Napoleonic Period in Europe. Professor STEPHENS.

An intensive study of the Napoleonic Period from 1799 to 1815, and its influence on Europe.

2 hrs., throughout the year. Tu Th, 2. Prerequisite: course 141A–141B and a reading knowledge of French.

151A–151B. History of England. Assistant Professor MORRIS.

Lectures on the political and constitutional history of England with The study of documents contained in Adams and Stephens, *Select Documents of English Constitutional History.*

3 hrs., throughout the year. M W F, 8. Prerequisite (for students with a major in history): course 1A–1B.

* Not to be given, 1917–18.

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152A–152B. Constitutional History of England.
Assistant Professor MORRIS.

A detailed study of the origin and growth of the English Constitution. Especially designed for students of law.

2 hrs., throughout the year. Tu Th, 8. Prerequisite: course 151A–151B. (May be waived by the instructor.)

*155A–155B. History of the British Empire. Professor STEPHENS.

(A) History of English colonies and dependencies; Colonial administration; India. (B) The West Indies, British Africa, North America, Australia and New Zealand.

2 hrs., throughout the year. Tu Th, 2. Prerequisite: course 1A–1B.

*161A–161B. History of Spain and Portugal.
Assistant Professor CHAPMAN.

The European background of Latin America with special emphasis on institutions.

(A) To 1516. (B) To date.

3 hrs., throughout the year. M W F, 8. Prerequisite (for students with a major in history): course 1A–1B. A reading knowledge of Spanish, Portuguese, or French is desirable.

162A–162B. History of Latin America. Assistant Professor CHAPMAN.

The grafting of Spanish and Portuguese civilization on the Americas, and the development of the Latin-American states, with emphasis on their relations to the United States. (A) To 1824. (B) To date.

3 hrs., throughout the year. M W F, 8. Prerequisite (for students with a major in history): course 1A–1B. A reading knowledge of Spanish, Portuguese, or French is desirable.

165A–165B. History of Latin-American Institutions.
Assistant Professor PRIESTLEY.

The development of social, economic, and political institutions in Latin America; comparative survey of the colonial institutions of the European settlements in America.

2 hrs., throughout the year. Tu Th, 8.

171A–171B. American History. Associate Professor MCCORMAC.

A general course dealing with the English colonies and the political history of the United States.

3 hrs., throughout the year. M W F, 10. Prerequisite (for students with a major in history): course 1A–1B.

172A–172B. American Constitutional History.
Associate Professor MCCORMAC.

Colonial governments; formation of the national constitution; historical development of constitutional government in the United States.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: course 171A–171B. (May be waived by the instructor.)

*Not to be given, 1917-18.

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*173A–173B. The Civil War and Reconstruction.
Associate Professor McCormac.

2 hrs., throughout the year. Tu Th, 10. Prerequisite (for students with a major in history): course 1A–1B.

181A–181B. The History of the West. Professor Bolton.

The settlement and development of the West, and the influence of the West upon national and international affairs at each stage of advance. The emphasis of the course is upon the Trans-Mississippi West.

3 hrs., throughout the year. M W F, 9. Prerequisite (for students with a major in history): course 1A–1B.

182A–182B. Spain in North America. Professor Bolton.

A general survey of the establishment of Spanish rule and Spanish institutions in North America, followed by a more detailed study of Spanish activities in and relative to territory now within the United States.

2 hrs., throughout the year. Tu Th, 9. Prerequisite: course 161A–161B, or 181A–181B, or 183A–183B. A reading knowledge of Spanish is desirable.

*183A–183B. European Expansion in North America. Professor Bolton.

Spanish, French, Dutch, Swedish, Russian, and English exploration and settlement in North America in their bearings upon the contest for the possession of the continent and upon the development of colonial policies.

3 hrs., throughout the year. M W F, 9. Prerequisite (for students with a major in history): course 1A–1B. A reading knowledge of French and Spanish is desirable.

189A–189B. History of California. Assistant Professor Chapman.

The relation of the history of California to that of New Spain, the far East, and the United States.

2 hrs., throughout the year. Tu Th, 8. Prerequisite (for students with a major in history): course 1A–1B and 161A–161B, or 162A–162B, or 171A–171B, or 181A–181B.

*191A–191B. Nineteenth Century History.

3 hrs., throughout the year.

GRADUATE COURSES

Students desirous of pursuing graduate work in history must register, immediately upon entrance, with the secretary of the department, Professor L. J. Paetow, 30 Benjamin Ide Wheeler Hall. A member of the department is appointed to supervise the work of each graduate student. Graduates from other institutions, before admission to graduate work, will be tested as to their knowledge of both European and American history.

Students who plan to undertake research work in Spanish-American history must have a thorough knowledge of Spanish.

The department of history issues a separate announcement which contains its requirements for the degree of Doctor of Philosophy.

*Not to be given, 1917-18.

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201A–201B. The Critical Study of Historiography. Professor STEPHENS.
2 hrs., throughout the year. W, 3–5.

202A–202B. Historical Method. Associate Professor PAETOW.
The work in the course is based primarily on Langlois and Seignobos, *Introduction to the Study of History*. The second half-year is devoted largely to practical exercises.
2 hrs., throughout the year. M, 2–4.

†203A–203B. The Theory of History. Associate Professor TEGGART.
An examination of modern ideas concerning the scope of history and the conditions of historical knowledge.
2 hrs., throughout the year. W, 3–5.

†205A–205B. Historical Bibliography. Associate Professor TEGGART.
Instruction in the methods of bibliography, followed by a detailed presentation of bibliographical information necessary for historical research.
2 hrs., throughout the year. F, 3–5.

*206A–206B. Historical Cartography. Associate Professor TEGGART.
2 hrs., throughout the year.

211A–211B. Ancient History. Assistant Professor SCHOLZ.
For 1917–18 the subject will be: Epigraphic and archaeological sources for the Principate of Augustus.
2 hrs., throughout the year. Th, 7:30–9:30 p.m.

212A–212B. Introduction to Latin Epigraphy.
Assistant Professor SCHOLZ.
(A) Lectures and practical exercises. (B) An intensive study and interpretation of selected inscriptions of the early Principate, with reference to the works of Tacitus, Suetonius, and Dio Cassius.
2 hrs., throughout the year, to be arranged.

221A–221B. Medieval History. Associate Professor PAETOW.
For 1917–18 the subject will be: The University of Paris in the thirteenth century.
2 hrs., throughout the year. Tu, 3–5.

*222A–222B. Introduction to Latin Palaeography and Diplomatics.
Associate Professor PAETOW.
The practical exercises in this course will be done mainly with facsimiles of manuscripts of the twelfth and thirteenth centuries.
2 hrs., throughout the year.

241A–241B. Modern European History. Professor STEPHENS.
For 1917–18 the subject will be: Diplomatic relations of the states of Europe from 1784 to 1792.
2 hrs., throughout the year. Tu, 7:30–9:30 p.m.

*Not to be given, 1917-18. † Not to be given, first half-year, 1917–18.

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*242A–242B. The French Revolutionary Period in Europe.
Professor STEPHENS.
2 hrs., throughout the year.

243A–243B. The Napoleonic Period in Europe. Professor STEPHENS.
The same lectures as in course 143A–143B, with additional work for graduate credit.
2 hrs., throughout the year. Tu Th, 2.

251A–251B. History of English Law. Assistant Professor MORRIS.
For 1917–18 the subject will be the judicial and administrative system of the twelfth and thirteenth centuries.
2 hrs., throughout the year. Th, 3–5.

*255A–255B. History of the British Empire. Professor STEPHENS.
2 hrs., throughout the year.

*261A–261B. History of Spain and Portugal.
Assistant Professor CHAPMAN.
2 hrs., throughout the year.

*262A–262B. History of Latin America. Assistant Professor CHAPMAN.
2 hrs., throughout the year.

265A–265B. History of Latin-American Institutions.
Assistant Professor PRIESTLEY.
For 1917–18 the subject will be: The Bourbon colonial policies, with special reference to their development in New Spain.
2 hrs., throughout the year. M, 7:30–9:30 p.m.

271A–271B. American History. Associate Professor MCCORMAC.
For 1917–18 the subject will be: The Jackson period.
2 hrs., throughout the year. Tu, 1–3.

281A–281B. The Southwest under Spain. Professor BOLTON.
2 hrs., throughout the year. Th, 3–5.

282A–282B. The Trans-Mississippi West since 1821. Professor BOLTON.
2 hrs., throughout the year. Th, 7:30–9:30 p.m.

289A–289B. California History. Assistant Professor CHAPMAN.
For 1917–18 the subject will be: California in the nineteenth century.
2 hrs., throughout the year. Tu, 7:30–9:30 p.m.

TEACHERS' COURSE

301. The Teaching of History. Assistant Professor MORRIS.
A discussion of the teaching of history in secondary schools, with special reports and criticisms of text-books.
3 hrs., either half-year. M W F, 11.

*Not to be given, 1917–18.

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HOME ECONOMICS

MARY F. PATTERSON, Assistant Professor of Household Art.
AGNES F. MORGAN, Ph.D., Assistant Professor of Household Science.
JOSEPHINE E. DAVIS, M.A., Assistant Professor of Household Science.
JOHN W. GILMORE, M.S., Professor of Agronomy.
ETHEL E. TAYLOR, B.S., Instructor in Textiles.
GERTRUDE PERCIVAL, A.B., Assistant in Household Art.
EDITH L. BROWN, M.S., Laboratory Assistant in Household Science.

Two distinct courses of study are offered under the general head of Home Economics, one in Household Art and the other in Household Science. These two courses may be combined by the individual student with the consent of the department. Such a combination is often impracticable, however, on account of the prerequisite drawing and design on the one hand and the prerequisite chemistry on the other. Students who wish to enter upon either of these courses of study or upon a combination of the two are urged to include in their work for matriculation, elementary chemistry, freehand drawing, cooking, and sewing as described under subjects 12*b*, 16, and 18 in the Circular of Information, Academic Departments.

HOUSEHOLD ART

Students who intend to do advanced work in household art should have completed matriculation subjects 18*c* and 18*e*, or their equivalents, and botany and chemistry. Lower division work at the University should include History 1A–1B; Economics 1A–1B; Household Art 122; Graphic Art 6. Courses recommended: Chemistry 1A–1B; Graphic Art 7 and 14A–14B; Drawing 9; Architecture 5; Political Science 1A, 1B; Philosophy 36A–36B. Students who intend to specialize in house furnishing should take in addition Drawing CD; Drawing 3A, 3B, and 3C are recommended. Such a course of study precedes training in the upper division for specialization in costume design and house furnishing.

Honor-students in the Upper Division.—Requirements for candidacy for honors in household art at graduation are as follows:

1. The creditable completion of 24 units of major work approved by the department.

2. The continuance of the honor-status, and the privileges and opportunities offered to candidates thereby, depends upon the ability of the student to do original and independent work and upon the maintenance of a high standard in all courses as well as in the special honor-work undertaken.

A reading knowledge of French, Italian, or German is most desirable. The artistic, historic, and economic aspects of "clothing" and "shelter"

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are possible fields for study. These fields may include the study of all types of decorative and applied art, the materials used, and their past and present mode of manufacture, whether by hand or machine processes. Such research is admirable as a basis for graduate work leading toward a master's degree.

UPPER DIVISION COURSES

NOTE.—With course 194A–194B it is strongly recommended that parallel courses be chosen from the following group: Graphic Art 114A–114B, 127A–127B, 128A–128B. Students who intend to enter the Seminar in Costume Design, 294A–294B, should normally complete these courses, and 192A–192B, 193A–193B, 194A–194B, 197 and 198.

192A–192B. Application of the Principles of Design and Proportion to Costume. Assistant Professor PATTERSON and Miss PERCIVAL.

Study of typical pattern forms; laboratory work in materials.

3 hrs., throughout the year; 1 unit each half-year. Th, 1–4. To precede or to be taken concurrently with course 193A–193B. Materials to be furnished by students. Prerequisite: matriculation subject 18*c* or equivalent.

193A–193B. The History of Costume. Assistant Professor PATTERSON.

Costume as pictured in the art of all ages, with a background of contemporary historical periods. Lectures illustrated with stereopticon. Students will be required to make a style book and a fee of $4 each half-year will be charged for the photographs so used.

2 hrs., throughout the year; 2 units each half-year. Tu Th, 10. Prerequisite: History 1A–1B (will not be required of students graduating in May, 1917 or 1918).

194A–194B. The History of Costume. Laboratory Course. Assistant Professor PATTERSON and Miss PERCIVAL.

Rendering of stuffs in pencil and color; original problems; analysis of styles from photographs and reproductions.

3 hrs., throughout the year; 1 unit each half-year. Sec. I, Tu, 1–4; Sec. II, W, 1–4. Prerequisite: Graphic Art 6, or equivalent. Course 193A–193B is required concurrently. Graphic Art 7 and 14A–14B are recommended.

195A–195B. House Furnishing. Assistant Professor PATTERSON and Miss PERCIVAL.

4 hrs., throughout the year; 2 units each half-year. Lectures, M, 11; laboratory, M, 1–4. Prerequisite: Drawing CD, History 1A–1B, matriculation subject 18*e*. Architecture 110, Civil Engineering 125, and Household Art 160 and 198 should, if possible, precede or parallel this.

196. Teachers' Course. Miss TAYLOR.

Lectures and discussion of methods.

2 hrs., first half-year; 2 units. Tu Th, 1. Conferences to be arranged. Prerequisite: senior standing.

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197. Review and Discussion of Technique by Practical Problems.
Miss TAYLOR.

6 hrs., second half-year; 2 units. W F, 1–4. Prerequisite: approved high school courses in matriculation subjects 18*c* and 18*e*, or their equivalents, and course 198, or equivalent. Materials to be furnished by students. Recommended to be taken concurrently with course 196.

122. Textile Raw Materials. Professor GILMORE.

Fibres of commerce, and those with commercial possibilities; the physical and chemical qualities and characteristics of fibres and their preparation for use on filatures, cordage and fabrics. Lectures and demonstrations.

2 hrs., second half-year. Tu Th, 9. Prerequisite: matriculation chemistry and botany.

198. Textiles. Miss TAYLOR.

Evolution of the textile industries, manufacture of fabrics, analysis of fibres and fabrics, costs, garment construction.

8 hrs., first half-year; 4 units. Lectures, Tu Th, 9; laboratory, W F, 1–4. Prerequisite: course 122, Economics 1A–1B. Laboratory fee, $1.50, covers cost of materials used for analysis and textile samples. Sewing materials to be furnished by students.

160. House Management. Miss TAYLOR.

Efficiency, service, convenience, economy, as applied in the house or institution. Lectures and discussions.

2 hrs., second half-year; 2 units. Tu Th, 9. Prerequisite: matriculation subject 18*e* or equivalent, Economics 1A–1B.

199. Honor-Course. The STAFF.

Special reading will be assigned individually, according to the interest and preference of the student, and frequent conferences with the instructor will be arranged.

Credit, not to exceed 2 units either half-year, will be determined in advance for each student.

GRADUATE COURSES

The Practice of Teaching.

Opportunity for practice teaching under the direction of Miss Taylor will be available either half-year in connection with Education 201. Prerequisite or parallel: course 196.

*294A–294B. Seminar in Costume Design.
Assistant Professor PATTERSON.

(A) Original design in materials and color drawings for modern costumes. (B) Period costumes, accompanied by historical research. Materials to be furnished by the students.

6 hrs., throughout the year; 2 units each half-year. W, 9–12; F, 8–11. Outside reading required.

*Not to be given, 1917–18.

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297. Advanced Study. Assistant Professor PATTERSON.
Hours to be arranged.

Allied courses which may be taken as major work in household art, with the consent of the department.

Graphic Art 114. (Advanced work in Freehand Drawing).
Assistant Professor JUDSON.

Graphic Art 117. (Advanced Color Study.)
Assistant Professor NEUHAUS.

Graphic Art 118. (Advanced Design.) Assistant Professor NEUHAUS.

Graphic Art 127, 128. (Art Anatomy.) Mr. NAHL.

Architecture 110. (Housing.) Assistant Professor HAYS.

Economics 182. (The Household as an Economic Agent.)
Associate Professor PEIXOTTO.

Civil Engineering 125. (Plumbing, Heating, Ventilating, and Lighting.)
Assistant Professor LANGELIER.

HOUSEHOLD SCIENCE

Students who wish to do advanced work in household science should have completed matriculation subject 18*d*. Courses in elementary and advanced cooking are not offered in the fall or spring sessions of the University; they may, however, be taken during the summer session. The lower division requirements are Chemistry 1A–1B, 5, 8A–8B; Economics 1A–1B. Political Science 1A, 1B, Bacteriology 1, Physiology 1, are strongly recommended. Such a course of study precedes training in the upper division for specialization in food economics or dietetics.

Honor-students in the Upper Division.—Students who are eligible for the honor-status are urged to enroll at the beginning of their third or junior year. The recommended sequence of courses for such students is as follows: third year, course 101A–101B, Biochemistry 101; fourth year, 120A–120B, 125 or 130, 199A–199B. Honors at graduation are awarded only on the basis of 24 units of major work and maintenance of the honor-status is dependent upon the attainment of consistently satisfactory grades in other subjects, and of high credit in household science courses.

Laboratory fees.—Courses 127, 130, 172 require a laboratory fee of $5, of which $2.50 is regarded as a deposit against breakage, the remainder after requisite deductions to be returned to the student at the end of the course.

Courses 101A–101B, 120A–120B, 125, 206 require a laboratory fee of $10 of which $5 is regarded as a deposit against breakage, and subject to the conditions mentioned above.

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UPPER DIVISION COURSES

101A–101B. Food Economics.

The composition, transportation, and preservation of common foods with reference to public economy and conservation; individual selection and preparation of such food with reference to hygiene, nutritive value, flavor, and cost.

8 hrs., throughout the year; 4 units each half-year. Lectures, Tu Th, 9; laboratory or field work, Tu, 2–5; S, 9–12. Prerequisite: Chemistry 1A–1B, 8A–8B, matriculation subject 18*d* (4 units).

120A–120B. Dietetics. Assistant Professor MORGAN.

The quantitative basis of dietetics established through typical experiments in food analysis and calorimetry, digestion experiments, respiration and dietary records, nitrogen and mineral balances; the chemistry and physiology of digestion and metabolism with emphasis upon energy relations; the application of these principles to practical feeding problems of the individual and the group.

8 hrs., throughout the year; 4 units each half-year. Lecture, Tu Th, 11; laboratory, M W, 8–11. Prerequisite: Chemistry 5; course 101A–101B, or Biochemistry 101 (5 units).

*125. Quantitative Experimental Cookery. Assistant Professor DAVIS.

Practice in food preparation under controlled conditions, with quantitative analysis of the materials and products. Investigation of special problems assigned to individual students. This course is preparatory to research work in the food and nutrition field.

7 hrs., second half-year; 3 units. Lectures, W, 8; laboratory, M W, 9–12. Prerequisite: course 101A–101B; Chemistry 5.

126. Methods of Teaching Household Science. Assistant Professor DAVIS.

Study of suitable equipment for teaching household science in elementary and secondary schools; planning of courses, and of single lessons; observations of classes; practice in public demonstrations of food preparation and classification.

4 hrs., first half-year; 2 units. Tu, 1, F, 1–4. Prerequisite: course 120A–120B, and at least 3 units of education.

127. Elementary Food Course for Advanced Students. Assistant Professor DAVIS.

A critical and constructive review of technique for students planning to teach cooking in the secondary schools. Open only to candidates for the teacher's recommendation offering a major or minor in household science.

6 hrs., second half-year; 2 units. M W, 1–4.

*Not to be given, 1917–18.

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130. The Nutrition of Development. Assistant Professor MORGAN.

The chemistry and physiology of ovulation, intra-uterine development, lactation, and growth; normal and subnormal nutrition in infancy and childhood; practice in the solution of feeding problems.

5 hrs., second half-year; 3 units. Lectures, Tu Th, 9; laboratory, Th, 2–5. Prerequisite: course 120A, or Biochemistry 101.

*172. Dyeing and Textile Chemistry. Assistant Professor MORGAN.

The chemical examination of common textiles; a study of the chemistry of dyes and dyeing.

4 hrs., first half-year; 2 units. Lecture, Tu, 9; laboratory, M, 1-4. Prerequisite: Household Art 198, Chemistry 5.

199A–199B. Honor-Course. The STAFF.

Open only to candidates for honors; guidance for honor-students in the prosecution of special reading, laboratory or field work.

2 hrs., throughout the year, to be arranged.

GRADUATE COURSES

The Practice of Teaching Household Science.

Opportunity for practice teaching under the direction of Assistant Professor Davis will be available either half-year in connection with Education 201. Prerequisite or parallel: course 126.

*206. Experimental Methods in Metabolism. —— ——.

Laboratory practice in the urine, blood, food and other analyses requisite for prescribed feeding in disturbed conditions of digestion and metabolism; metabolism experiments on animal and human subjects.

7 hrs., first half-year; 3 units. Lecture, M, 8; laboratory, M, 9–12; Th, 1–4. Prerequisite: course 120A–120B.

214. Research. Assistant Professor MORGAN.

The principles and methods of physical and biological chemistry applied to the investigation of problems concerned with food preparation and metabolism.

Hours and topics to be arranged, either half-year.

215. Special Studies.

Hours and topics to be arranged, either half-year.

216. Seminar. Assistant Professor MORGAN.

Recent advances in the chemistry of food and nutrition, metabolism, food economics, and dietetic therapy.

2 hrs., first half-year, to be arranged.

* Not to be given, 1917–18.

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HYGIENE

ROBERT T. LEGGE, Ph.G., M.D., F.A.C.S., Professor of Hygiene and University Physician.

WILBUR A. SAWYER, A.B., M.D., Secretary, California State Board of Health.

JOHN N. FORCE, M.D., M.S., Gr.P.H., Assistant Professor of Epidemiology.

ROMILDA P. MEADS, B.S., M.D., Assistant Professor of Hygiene and Physician for Women.

JAMES GORDON CUMMING, M.D., M.S.P.H., Dr.P.H., Director, Bureau of Communicable Diseases, State Hygienic Laboratory.

ALBERT M. MEADS, B.S., M.D., Lecturer in Hygiene and Associate University Physician.

KATE GOMPERTZ, B.S., M.D., Physician for Women.

MILTON H. SCHUTZ, A.B., M.D., Ophthalmologist in University Infirmary.

RUTH C. RISDON, B.S., M.D., Assistant Physician for Women.

CHARLES L. MCVEY, A.B., M.D., Physician for Men.

RUBY L. CUNNINGHAM, M.D., M.S., Instructor in Hygiene and Assistant Physician for Women.

ALVIN POWELL, B.S., M.D., Roentgenologist.

GERALD FREDERICK STOODLEY, D.D.S., Dental Surgeon.

BENJAMIN GERRY NEFF, D.D.S., Dental Surgeon.

FRANK L. KELLY, M.D., M.S., Gr.P.H., Assistant Epidemiologist, State Board of Health.

LAURA CAIRNS, M.S., Assistant in Hygiene.

IDA M. STEVENS, M.A., Assistant in Hygiene.

ETHEL SHERMAN, Superintendent of Infirmary.

Laboratory fees are $5 for courses 102 and 108; $5 additional deposit is required in each laboratory course and will be refunded, less deduction for breakage, at the end of the half-year.

Professional Course in Public Health.—The professional course in public health comprises a curriculum in medicine, sanitary engineering, hygiene, economics, political science, veterinary science, entomology, zoology, and nutrition, the completion of which leads to the degree of Graduate in Public Health (Gr.P.H.). For details of the curriculum the student is referred to the Circular of Information, Academic Departments.

Honor-students in the Upper Division.—Students in the honor-group may receive honors at graduation either

1. Upon presenting a satisfactory report on a field investigation of a public health activity, or,
2. Upon a thesis based on a laboratory investigation, or,
3. Upon the completion of a course of reading on a special topic in public health.

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Candidates for honors must prepare a programme at the beginning of their candidacy in consultation with the Committee on Public Health Study-Lists. In most cases the junior year will be spent in preliminary reading. In the senior year, those students who desire to take honors on the basis of reading alone will prepare for a final oral examination; while those who desire to engage in laboratory or field investigations will prepare a thesis, or report embodying their results.

The work done by honor-students must be consistently of high quality. The committee will recommend the exclusion from the honor-group of all students who do not maintain each half-year an average of at least 60 per cent of first and second grades in all their courses and who do not complete their courses in public health with high credit.

Candidates must complete 24 units in major courses chosen from the first two years of curriculum A in Public Health, and must include in their studies 12 units of major courses in hygiene.

LOWER DIVISION COURSES

1. Principles of Hygiene and Sanitation. Professor LEGGE.

Lectures, readings, and recitations.

2 hrs., first half-year. Tu Th, 11. Prescribed for all undergraduate men during their first year of residence.

2. Essentials of Personal and Public Hygiene. Assistant Professor MEADS.

Lectures, readings, and recitations.

2 hrs., first half-year. M W, 11. Prescribed for all undergraduate women during their first year of residence.

3. Elementary Epidemiology. Assistant Professor FORCE.

Communicable diseases now prevalent in California; their control through individual and community endeavor. General problems of food, water, insect, contact, and carrier control. Lectures, readings, recitations, and papers.

3 hrs., first half-year. M W F, 10.

UPPER DIVISION COURSES

FREE ELECTIVE COURSES

4. Domestic Hygiene. Miss CAIRNS.

Lectures on home sanitation. Primarily for students in home economics.

2 hrs., first half-year. Tu Th, 11.

5. Home Care of the Sick.
Assistant Professor MEADS, Dr. GOMPERTZ, Dr. RISDON, Dr. CUNNINGHAM, and Miss SHERMAN.

A course for women in general therapeutic measures of use in caring for individuals at home. Instruction in First Aid will be included. Class limited to seniors.

2 hrs., second half-year. Sec. I, Tu Th, 9; II, Tu Th, 10; III, Tu Th, 2.

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6. Industrial Hygiene. Professor LEGGE.

For engineering, commerce, and forestry students. General problems in the control of epidemic and occupational diseases and sanitation of labor camps and factories, accident prevention, employees' welfare and compensation laws. Lectures, recitations, papers, and field surveys.

2 hrs., second half-year. M W, 11.

7. First Aid. Dr. MEADS.

A course for men in the recognition and emergency treatment of common accidents. Class limited to eighty.

2 hrs., second half-year; 1 unit. Tu Th, 10.

8. Mine Sanitation. Professor LEGGE.

For students in mining. Sanitation of mines; methods of rescue and accident treatment.

1 hr., second half-year. Tu, 4.

MAJOR COURSES

101. Child Hygiene. Professor LEGGE.

Primarily for students who intend to become teachers, but open also to students of economics. The hygiene of early child life; the cause and prevention of infant mortality; health supervision of school children and the practical sanitation of schools. Lectures, readings, recitations, papers, and field assignments.

3 hrs., second half-year. M W F, 10.

102. The Teaching of Hygiene. Dr. CUNNINGHAM and Miss STEVENS.

A laboratory course in methods of presenting the elements of hygiene and sanitation to children in graded schools. Primarily for persons preparing to teach hygiene.

6 hrs., first half-year; 2 units. Sec. I, Tu Th, 8–11; II, Tu Th, 1–4.

104. Health Surveys. Assistant Professor FORCE.

Lectures, readings, individual reports and class field assignments on public health administration and procedures.

5 hrs., second half-year; 3 units. M W, 9; S, 9–12. Prerequisite: Bacteriology 1 and Chemistry 1A–1B.

107. Advanced Epidemiology. Assistant Professor FORCE.

Lectures, readings, and individual reports on communicable diseases.

3 hrs., first half-year. M W F, 9. Prerequisite: Bacteriology 1 and Chemistry 1A–1B.

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108A–108B. Public Health Laboratory.
Assistant Professor FORCE and Miss STEVENS.

Instruction in standard methods of examination of air, water, and milk. Laboratory practice in the detection of communicable diseases.

9 hrs., throughout the year; 3 units each half-year. M W F, 1–4. Prerequisite: Bacteriology 1 and Chemistry 1A–1B.

GRADUATE COURSE

201. Research in Hygiene. Assistant Professor FORCE and Miss STEVENS.

Special problems worked out in the field or in the laboratory of hygiene. Credit value to be fixed in each case.

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IRRIGATION

BERNARD A. ETCHEVERRY, B.S., Professor of Irrigation Engineering.
SIDNEY T. HARDING, B.S., Assistant Professor of Irrigation.

Courses 101, 102A, 102B, 103, 104, and 112 are designed to meet the needs of engineering students who wish to make a specialty of irrigation. They appear as part of the course in Irrigation Engineering in the College of Civil Engineering. Courses 101, 104, 105A, 105B, 113 and 115 are designed for students in the College of Agriculture. Courses 101, 103, 113, are also open to other students who have junior standing.

Students will be recommended for honors on the same basis as in civil engineering.

UPPER DIVISION COURSES

101. Irrigation Institutions and Economics.
Assistant Professor HARDING.

Water rights, irrigation institutions and organizations.

3 hrs., second half-year. Sec. I, M W F, 10, for engineering students only; Sec. II, M W F, 8, open to non-engineering students. Prerequisite: course 103 or 113.

102A. Irrigation Engineering. Professor ETCHEVERRY.

Investigation and general planning of irrigation systems; conveyance of water; silt problems; designs of canals, tunnels, flumes, pipe-lines, inverted siphons.

2 hrs., second half-year. Tu Th, 8. Prerequisite: Civil Engineering 110 or Mechanical Engineering 103A.

*102B. Irrigation Engineering. Professor ETCHEVERRY.

Principles of design of diversion weirs, headworks, wasteways, sand boxes, falls, checkgates, lateral headgates, road crossing, special types of distribution systems, measuring devices.

2 hrs., first half-year. Tu Th, 9. Prerequisite: course 102A.

103. Agricultural Use of Water and Irrigation Practice.
Professor ETCHEVERRY.

Sources of water supply; disposal of irrigation water applied to the soil; water requirement of crops; duty of water; preparation of land and methods of irrigation; small pumping plants.

2 hrs., first half-year; 2 units. Tu Th, 11. For engineering students, but open to other students excepting those in the College of Agriculture, for whom course 113 is offered. Prerequisite: junior standing.

* Not to be given, 1917–18.

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104. Drainage. Professor ETCHEVERRY.

The structure of soils and its relation to drainage; planning of drainage systems for overflow lands and for waterlogged and alkali lands; organization of drainage districts.

2 hrs., second half-year. Tu Th, 9. Prerequisite: junior standing.

105A. Agricultural Hydraulics and Elements of Irrigation Engineering. Professor ETCHEVERRY.

Principles of hydraulics as applied to irrigation systems. The elements of irrigation projects; the conveyance of water in canals, tunnels, flumes, and pipe-lines.

5 hrs., second half-year; 3 units. Tu Th, 10; W, 1–4. Open to students in the College of Agriculture. Not open to students who receive credit for course 102A. Prerequisite: Civil Engineering 1.

105B. Agricultural Hydraulics and Elements of Irrigation Engineering. Professor ETCHEVERRY.

Irrigation structures, their function and proportions; systems of distribution; measurement of water and measuring devices.

2 hrs., first half-year. Tu Th, 8. Prerequisite: course 105A.

112. Irrigation Design. Professor ETCHEVERRY.

The design of irrigation structures, such as headgates, flumes, and drops; estimates of cost of such structures.

6 or 9 hrs., first half-year; 2 or 3 units. Tu Th, 1–4. Prerequisite: course 102, Civil Engineering 108A–108B.

113. Agricultural Use of Water and Irrigation Practice. Assistant Professor HARDING.

Soil moisture and plant growth; disposal of irrigation water applied to the soil; water requirement of crops; duty of water: preparation of land and methods of irrigation; farm ditches and structures; small pumping plants; measurement of water.

3 hrs., first half-year; 3 units. Three sections: I, Tu Th S, 9; II, Tu Th S, 10; III, Tu Th S, 11. For students in the College of Agriculture, but open to other students. Prerequisite: junior standing.

115. Irrigation Drawing. Assistant Professor HARDING.

Drawing and making estimates of typical irrigation structures as used on the farm.

6 hrs., first half-year; 2 or 3 units. Tu Th, 1–4. For students in the College of Agriculture. Prerequisite: course 105.

119. Undergraduate Thesis Course.

2 units, either half-year.

GRADUATE COURSES

202. Irrigation Design. Professor ETCHEVERRY.

Advanced design of irrigation structures.

6 hrs., second half-year; 2 units. Prerequisite: course 112. Open to specially prepared seniors.

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207. Operation and Maintenance of Irrigation Systems.
Assistant Professor HARDING.

2 hrs., first half-year. Prerequisite: courses 113 and 105 for agricultural students; courses 103 and 102 for engineering students. Open to specially prepared seniors.

208. Seminar in Irrigation.
Professor ETCHEVERRY and Assistant Professor HARDING.

Conferences on topics concerning the development of irrigation industry. Hours to be arranged. Open to specially prepared seniors.

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JURISPRUDENCE

WILLIAM CAREY JONES, M.A., Professor of Jurisprudence and Director of the School of Jurisprudence.

ORRIN K. MCMURRAY, Ph.B., LL.B., Professor of Law.

CURTIS H. LINDLEY, LL.D., Honorary Professor of the Law of Mines and Water.

[2]ALEXANDER M. KIDD, A.B., LL.B., Professor of Law.

EDWARD ELLIOTT, Ph.D., Professor of Politics and International Law.

FRANCIS S. PHILBRICK, Ph.D., LL.B., Professor of Law.

[1]EUGENE A. GILMORE, A.B., LL.B., Professor of Law.

MATTHEW C. LYNCH, B.L., J.D., Associate Professor of Law.

AUSTIN T. WRIGHT, A.B., LL.B., Associate Professor of Law.

FARNHAM P. GRIFFITHS, B.L., A.B., Lecturer in Law.

ARTHUR G. TASHEIRA, A.B., LL.B., Lecturer in Law.

WILLIAM E. COLBY, LL.B., Lecturer on Law of Mines and Water.

MAURICE E. HARRISON, A.B., J.D., Lecturer in Law.

ALLAN P. MATTHEW, A.B., LL.B., Lecturer on the Law of Public Utilities.

JOHN U. CALKINS, Jr., B.L., J.D., Lecturer in Commercial Law.

HERMAN H. PHLEGER, B.S., Lecturer in Law.

CHARLES E. TOWNSEND, Ph.B., LL.B., Lecturer on Patent Law.

SCOPE OF THE SCHOOL OF JURISPRUDENCE

The design of the School of Jurisprudence is to furnish instruction, whether historical, theoretical, or practical, in the whole orbit of law, international, public, and private. On the historical and theoretical side it offers courses in comparative law, Roman law, jurisprudence, or the theory of law, and on various topics in the history of the common law.

On the practical side, it offers a complete professional curriculum, based on at least three years of academic training. The main body of this curriculum is of general application, constituting a preparation for the practice of law in any jurisdiction founded on the common law. At the same time, emphasis is given to courses which direct attention to local legal conditions and practice in the Western states such as mining law, water law, and code procedure. The case method of instruction is used in the professional courses.

BOALT HALL OF LAW

The School of Jurisprudence occupies the Boalt Memorial Hall of Law, a building designed exclusively for the purposes of legal instruction. It was erected through the generosity of the late Mrs. Elizabeth Boalt, supplemented by subscriptions from California lawyers, as a memorial to her husband, the late John H. Boalt.

[1] In residence first half-year only; [2], second half-year only.

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Law Library.—The law library contains a valuable collection of over twenty thousand volumes, and is being constantly extended and improved. It is conveniently placed in connection with the reading room in Boalt Hall of Law.

Law Library Fee.—A law library fee of $12.50 each half-year is charged all students, regular and special, who are registered in more than one professional course in law. All moneys accruing from such fees are devoted to the purchase of books for the law library of the School of Jurisprudence.

Admission to the Professional Curriculum.—The following persons will be admitted without examination, as candidates for the degree of Juris Doctor: (1) graduates of any college of the University of California, and of other colleges and universities of approved grade; (2) students admitted to senior standing in the University of California.

Students who enter the professional curriculum with senior standing may obtain the academic bachelor's degree on the satisfactory completion of the first year of such curriculum, provided that not more than 26 units of professional law work will be counted toward the bachelor's degree.

The student entering the University with the intention of pursuing the course in law is advised to map out his undergraduate curriculum with great care. He is invited to consult members of the School of Jurisprudence in respect thereto.

Any student who has secured the junior certificate and has done one year's additional work in the University, or who, in other words, is ready to enter upon the senior year of the undergraduate course, may take up the regular professional curriculum in law. The course in Roman law and jurisprudence, however, should regularly be taken in the junior year. Other subjects in law that may also be taken before the undergraduate senior year are elementary law and international law.

The intending student of law who is prepared to do so is advised to enroll in the College of Letters and Science and pursue a full classical curriculum. If such a course is not attainable, the student is advised to take as thorough a course in Latin as possible. Such study will be profitable to him in many ways, and will open up the possibility of scholarly research in civil law and jurisprudence in the graduate years. The attention of the law student is called to the course in elements of law Latin (Latin La–Lb) offered by the department of Latin.

Every student of law should normally pursue a systematic course in history, political science and economics. The department of history has adjusted some of its courses with special reference to the needs of the law students. Under this arrangement, the intending law student is advised to take History 1a–1b, General History, in the freshman year. If he does good work in this subject, he will be admitted, in his sophomore year, to the two junior courses, 151, History of England, and 171, American History. He will then be eligible, in his junior year, to take the two senior courses, 152, English Constitutional History, and 172b, American Constitutional History. In political science, he should take, at least, Political Science 1a. In economics, he should take Economics 1a–1b, 101, or 100, and courses in accounting. Having taken these subjects in political science and economics not later than his sophomore year, he will be in a position to elect in his junior year such subjects as municipal government, political theories, modern industrialism, banking, public finance, railway problems, and other fruitful courses offered by the departments of political science, economics, and history.

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The intending student of law is likewise advised to make careful selection of courses in the departments of English and philosophy.

Whatever direction the student's pre-legal training may take, whether in history, letters, pure science, or applied science, the importance cannot be too strongly impressed upon him of pursuing systematic and thorough courses in one or two departments rather than of making up a curriculum of fragmentary and unrelated subjects in a number of departments.

Moot Courts

Students in the first year of the professional course are expected to prepare and argue several cases in the moot courts during the year. Second-year and third-year students supervise and assist in this work. Special sessions of these courts are planned so that third-year students taking the courses in evidence and practice may conduct the trials of cases which are specially prepared.

Further Information

For fuller information in regard to the law school, consult the annual Announcement of the School of Jurisprudence.

LOWER DIVISION COURSES

10A–10B. Elementary Law. Professor Philbrick.

The general principles of the law. Students who intend to continue the study of law are advised to take this course in their sophomore year.

2 hrs., throughout the year. Two sections: Tu Th, 9, 11.

18A–18B. Commercial Law. Dr. Calkins.

2 hrs., throughout the year. M W, 8. For students in the College of Commerce. Students who intend to pursue the professional curriculum are advised ordinarily not to take this course.

UPPER DIVISION COURSES

103A–103B. Principles of International Law. Professor Elliott.

2 hrs., throughout the year. M W, 10.

105A–105B. Roman Law: Jurisprudence. Mr. Griffiths.

History of the development of the public and private law of the Romans; systematic and historical exposition of Roman law, with comparative views of the chief modern systems; the science of positive law.

2 hrs., throughout the year. Tu Th, 8. The student is advised to take this course in the junior year. Required for the major in jurisprudence and for the degree of J.D. Course 105A is prerequisite to course 105B, except that instead of course 105A students may take Latin 121 (see below).

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107A–107B. Anglo-American Legal Institutions. Professor McMURRAY.
An historical survey of the principal English and American legal institutions. For students of law in their junior year.
2 hrs., throughout the year. Tu Th, 10.

Elementary Roman Law. [See Latin 121.] Professor MERRILL.
The Institutes of Justinian.
3 hrs., first half-year, to be arranged.

118A–118B. Advanced Commercial Law. Dr. CALKINS.
The study of cases of principal importance. For senior students in the College of Commerce, but open to other upper division students with the consent of the instructor. Credit in this course cannot be applied toward the total units of law required for the J.D. degree.
2 hrs., throughout the year. Tu Th, 8.

Administrative Law of Modern European States (see Political Science 118). Dr. EHRLICH.

*109. School Legislation of California. Professor JONES.
An interpretative and critical study of California school law as a resultant of social and political conditions and forces.
2 hrs., second half-year. S, 8–10.

THE PROFESSIONAL CURRICULUM

First Year

111A–111B. The Law of Property I. (*a*) Personal Property; (*b*) Introduction to Real Property. Professor McMURRAY.
3 hrs., throughout the year. M W F, 10.

112A–112B. The Law of Torts. Professor JONES.
2 hrs., first half-year; Tu Th, 10. 3 hrs., second half-year, Tu Th, 10, F, 9.

113. Criminal Law and Procedure. Professor GILMORE.
4 hrs., first half-year. Tu Th, 9; W F, 8.

115A–115B. The Law of Contracts. Associate Professor LYNCH.
3 hrs., throughout the year. First half-year, M W F, 9; second half-year, M W, 9, F, 8.

119. Common Law Procedure. Associate Professor WRIGHT.
1 hr., first half-year. Th, 11.

120. Law of Associations I. (Agency.) Associate Professor WRIGHT.
2 hrs., second half-year. M W, 8.

122. Equity I. Associate Professor LYNCH.
2 hrs., second half-year. Tu Th, 9.

* Not to be given, 1917–18.

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GRADUATE COURSES

NOTE.—While all the courses in the second and third years are elective, they are distributed by years and are so arranged on the schedule of exercises. The student is advised to observe this arrangement by years, so as to secure the advantage of proper sequence of study and avoid conflict in hours of lecture.

Second Year

217. The Law of Property II. (*a*) Conveyances; (*b*) Wills and Administration. Professor MCMURRAY.
3 hrs., throughout the year. M W, 11; F, 8.

202. Constitutional Law. Professor JONES.
2 hrs., throughout the year. Tu Th, 9.

225. Law of Associations II. Agency, Partnership, Corporations. Associate Professor WRIGHT.
3 hrs., throughout the year. M W F, 10.

227. Equity II. (*a*) Equity; (*b*) Trusts. Associate Professor LYNCH.
2 hrs., first half-year; Tu Th, 10. 3 hrs., second half-year, Tu Th, 10; F, 9.

230. Business Law. Mr. TASHEIRA.
Negotiable instruments, mortgages, trust deeds, banking.
2 hrs., throughout the year. M W, 8.

231. The Law of Suretyship. Professor PHILBRICK.
2 hrs., first half-year. M W, 9.

235. The Law of Damages. Professor PHILBRICK.
2 hrs., second half-year. M W, 9.

216. The Law of Mines I. Mr. COLBY.
2 hrs., first half-year. Tu Th, 8.

NOTE.—By arrangement, students in the College of Mining may take a portion of this course and receive one unit of credit.

210. The Law of Water. Mr. COLBY.
2 hrs., second half-year. Tu Th, 8.

203A–203B. Seminar in International Law. Professor ELLIOTT.
2 hrs., throughout the year. M, 3–5.

270. History of European Law. Professor PHILBRICK.
A reading course. Part of the reading to be done by each student will be selected either with general reference to a particular country, or with comparative reference to a general movement in different countries; and part will be selected with comparative reference to the history of a particular branch of law, upon which a paper will be prepared.
1 hr., first half-year, to be arranged.

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275. Modern Juristic Thought. Professor PHILBRICK.
A reading course. Books and articles will be assigned for study, and each student will prepare a paper.
1 hr., second half-year, to be arranged.

Third Year

221. The Law of Evidence. Professors GILMORE and KIDD.
2 hrs., throughout the year. Tu Th, 10.

229. Code Procedure. Dr. HARRISON.
2 hrs., throughout the year. S, 8–10.

240. Conflict of Laws. ——— ———.
2 hrs., throughout the year. M W, 11.

224. The Law of Sales. Associate Professor LYNCH.
3 hrs., first half-year. Tu Th, 11, F, 8.

226. The Law of Public Service. Mr. MATTHEW.
2 hrs., throughout the year. Tu Th, 8.

208. The Law of Municipal Corporations. Professor JONES.
2 hrs., second half-year. W, 10–12.

243. Insolvency and Bankruptcy. Mr. PHLEGER.
2 hrs., first half-year. M W, 8.

218. The Law of Mines and Water II. Mr. COLBY.
Original research upon assigned topics with class reports and criticisms. Open to qualified students who have completed course 216 or course 210.
1 hr., either half-year, to be arranged.

233. Practice. Professor KIDD.
2 hrs., second half-year. M F, 10.

209. Anglo-American Jurisprudence. Research course. Professor PHILBRICK.
2 hrs., first half-year, to be arranged.

245. Comparative Law. Professor PHILBRICK.
Comparative history of selected legal ideas.
2 hrs., second half-year, to be arranged.

207. Seminar in Roman Law. Professor JONES.
2 hrs., first half-year, to be arranged.

244. Admiralty. Associate Professor WRIGHT.
2 hrs., first half-year. Th F, 9.

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254. Seminar in Admiralty and Maritime Law.
Associate Professor WRIGHT.
2 hrs., second half-year, to be arranged. Prerequisite: course 244.

250. Persons. Associate Professor WRIGHT.
2 hrs., first half-year. M Tu, 9.

251. Quasi Contracts. Mr. PHLEGER.
2 hrs., second half-year. M W, 8.

260. The Law of Patents, Trademarks, and Copyrights. Mr. TOWNSEND.
2 hrs., first half-year. W, 9–11.

Seminar in the Public Law of Modern European States (see Political Science 209). Dr. EHRLICH.

NOTE.—Students who plan to take the law courses in their senior year should have all other college work completed by the end of their junior year.

Students in the College of Commerce who desire to take more than courses 10A–10B, 18A–18B, 118A–118B, and 103A–103B should consult the Director of the School.

Graduate standing implies that the student has credit for courses 105A–105B, 111A–111B, 112A–112B, 113, 115A–115B, 119, 120, 122.

Latin 121 may be included in the advanced work in jurisprudence.

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LATIN

WILLIAM A. MERRILL, Ph.D., L.H.D., Professor of the Latin Language and Literature.

LEON J. RICHARDSON, A.B., Associate Professor of Latin.

CLIFTON PRICE, Ph.D., Assistant Professor of Latin.

HERBERT C. NUTTING, Ph.D., Assistant Professor of Latin.

OLIVER M. WASHBURN, A.B., Assistant Professor of Classical Archaeology.

MONROE E. DEUTSCH, Ph.D., Assistant Professor of Latin.

TORSTEN PETERSSON, Ph.D., Instructor in Latin.

College of Letters and Science.—Students in the College of Letters and Science who have credit for matriculation subject 6 may satisfy any prescription of additional Latin by approved combinations of courses A, B, C, L, 1B, 1C, 5B, aggregating 6 units.

Students who are preparing for major work in Latin will find it to their advantage to acquire a reading knowledge of French and German, and to take as much work in Greek and ancient history as may be possible.

Honor-students in the Upper Division.—Students in the honor-group whose major subject is Latin may receive honors at graduation by passing a special examination at the end of the senior year or by maintaining a superior quality of work throughout the course. At the outset of each half-year they will submit their study-lists for approval to the head of the department. Thereafter they will proceed with their work under the supervision of their instructors, attending conferences and making such reports of progress as may be asked for. At the close of each half-year the department will recommend the exclusion from the honor-group of students who have fallen below the standard and the promotion to the group of those whose work merits distinction.

Courses in Other Departments.—As part of the 24 units required of candidates for honors in Latin major courses in the following subjects will be accepted: Greek, ancient history, Roman law, linguistics, Sanskrit, philosophy, and such major courses in English or foreign languages as deal with literary types. The number and character of acceptable courses will vary with circumstances, and will be determined in the case of each student when his proposed study-list is submitted for approval.

LOWER DIVISION COURSES

Courses A and B are intended mainly for students who enter with two or three years of preparatory Latin.

B. Third-year Latin, Ciceronian Prose.
Assistant Professors NUTTING, WASHBURN, DEUTSCH, and Dr. PETERSSON.

3 hrs., either half-year. First half-year, Tu Th S, 8. Second half-year, M W F, 2. Prerequisite: matriculation subject 6. Not open to students who present Cicero at matriculation.

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A. Fourth-year Latin, Augustan Poetry.
Assistant Professors NUTTING, PRICE, WASHBURN, DEUTSCH, and Dr. PETERSSON.

3 hrs., either half-year. Second half-year, Tu Th S, 8. First half-year, M W F, 8, 10. Intended for students who have received credit for course B and also for students who enter with but 9 units of matriculation Latin. Not open to students who present Virgil at matriculation.

LA–LB. Elements of Law Latin. Professor MERRILL.

This course is planned for future students of the law.

3 hrs., throughout the year. M W F, 10. Prerequisite: matriculation subject 6. Latin L is not a substitute for Latin 1 or 2.

1. Cicero and Pliny.
Assistant Professors PRICE, DEUTSCH, and Dr. PETERSSON.

The Cato Maior of Cicero and the Letters of Pliny. Systematic study of syntax and synonyms. Practice in reading aloud and in translation at hearing, and in pronunciation, phrasing and emphasis.

3 hrs., either half-year. First half-year, M W F, 8, 9; Tu Th, 9, and a third hour. Second half-year, M W F, 10. Prerequisite: matriculation subjects *7a* and *7b* or their equivalent.

2. Plautus and Catullus (or Livy).
Assistant Professors PRICE, DEUTSCH, and Dr. PETERSSON.

One play of Plautus; selections from Catullus.

3 hrs., either half-year. First half-year, M W F, 2. Second half-year, M W F, 8, 9. Prerequisite: course 1.

5. Horace and Virgil.
Associate Professor RICHARDSON and Assistant Professor PRICE.

The Odes and Epodes of Horace. Private readings of selections from Virgil's Aeneid, VII–XII.

3 hrs., either half-year. First half-year, M W F, 9; Tu Th, 9 and a third hour. Second half-year, Tu Th, 9; M, 4. Prerequisite: course 2.

COURSES IN SIGHT TRANSLATION

The object of these courses is to gain ability to read, and in some measure to speak, the Latin language. Courses 1B, 1C, and 5B will be found especially useful to students who have found it necessary to give up the study of Latin in the ordinary courses.

1B. Sight Translation, I. Assistant Professor DEUTSCH.

Practice in reading at sight from easy authors, particularly Caesar.

2 hrs., first half-year; 1 unit. Tu Th, 1. Prerequisite: matriculation subject 6. Intended especially for freshmen in any college, but may be taken by more advanced students, in either the lower or upper division, who do not pursue other courses in Latin; or without credit by advanced students in Latin.

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1c. Sight Translation, II. Assistant Professor Deutsch.

Practice in reading at sight from Cicero.

2 hrs., second half-year; 1 unit. Tu Th, 1. Prerequisite: matriculation subject *7a*, or course B, or course 1b. Intended especially for freshmen in any college, but may be taken by more advanced students, in either the lower or upper division, who do not pursue other courses in Latin; or without credit by advanced students in Latin.

5b. Sight Translation, III. Associate Professor Richardson.

Translation at sight of more difficult Latin, and translation at hearing.

2 hrs., either half-year; 1 unit. Tu Th, 11. Prerequisite: course 5 completed or in progress, or course 1b, or course 1c, or the consent of the instructor. This course may be repeated with credit. Intended especially for sophomores, and may be taken by more advanced students, whether pursuing other courses in Latin or not as a free elective. Students may enter this course either in August or January.

Courses in Latin Writing, Lower and Upper Division

The object of the courses in Latin writing is, first, training in forms and syntax; later, in idiom, style, and periodology through imitation of classical examples; finally, in original composition.

CA–CB. Latin Composition, Preliminary Course. Assistant Professor Nutting.

1 hr., throughout the year. S, 9. Prerequisite: matriculation subject *6b*.

3a–3b. Latin Composition, I. Assistant Professor Nutting.

Exercises in writing Latin prose narrative.

1 hr., throughout the year. Th, 1, 2. Prerequisite: matriculation subjects $7c^1$, or $7c^2$, or course CA–CB.

104a–104b. Latin Composition, II. Assistant Professor Deutsch.

Writing in Latin in periodic style.

1 hr., throughout the year. Tu, 2. Prerequisite: course 3a–3b. Students may be promoted into this course from course 3a–3b at mid-year, in special cases.

112a–112b. Latin Composition, III. Associate Professor Richardson.

Translation of English selections and of Latin poetry into Latin prose. Training in Latin expression and construction.

1 hr., throughout the year. F, 1. Prerequisite: course 104a–104b.

113a–113b. Latin Composition, IV. Professor Merrill.

Original Latin essays; practice in narrative and argument.

1 hr., throughout the year, to be arranged. Prerequisite: course 112a–112b.

285. Advanced Latin Composition. [See graduate courses.]

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UPPER DIVISION COURSES

Courses A, B, L, 1 to 5, author courses; 1B, 1C, 5B, sight reading; CA–CB, 3A–3B, composition courses; all of which as described above with prerequisites necessary, may be taken as free electives by students in the upper division.

The specific prerequisite for all of the major courses is course 5. Course 107, 108, or 110 must precede all others, and but one of them may be taken.

MAJOR COURSES

104. Latin Composition, II. [See above.]

107. Tacitus, Germania and Agricola. Mackail's Roman Literature. Associate Professor RICHARDSON.

3 hrs., first half-year. Tu Th, 9; F, 4. Prerequisite: course 5. Not open to students who have credit for course 108 or 110.

110. Horace, Satires and Epistles. Assistant Professor PRICE.

3 hrs., second half-year. M W F, 8, 9. Prerequisite: course 5. Not open to students who have credit for course 107 or 108.

112A–112B. Latin Composition, III. [See above.]

113A–113B. Latin Composition, IV. [See above.]

116. Ovid; Propertius. Associate Professor RICHARDSON.

Ovid, Fasti; Propertius, Book IV. Roman religion and folk-lore, with modern parallels.

3 hrs., first half-year. Tu Th, 10; W, 4.

117. Virgil's Georgics. Associate Professor RICHARDSON.

Reading, translation, and exegesis. Theory of the Virgilian hexameter, and the art of reading classical Latin poetry.

2 hrs., first half-year. M W, 10.

119. Patristic Latin. Professor MERRILL.

The Confessions of St. Augustine and the Christian Hymn Writers, with particular reference to the language.

2 hrs., second half-year. M W, 11.

121. Elementary Roman Law. Professor MERRILL.

The Institutes of Justinian.

3 hrs., first half-year, to be arranged. This course is listed in the department of jurisprudence. It is open also to students who have credit for course L, and to others by permission of the instructor.

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122. Roman Literature. Dr. PETERSSON.

Lectures, and reading in Latin and English.

3 hrs., second half-year. M W F, 9.

123. Tacitus, Suetonius. Professor MERRILL.

Tacitus, Annals; Suetonius, Tiberius. The character of Tiberius.

2 hrs., first half-year. M W, 11.

125. Lucretius: De Rerum Natura. Associate Professor RICHARDSON.

Criticism and interpretation of the poem and outline of the Epicurean system.

3 hrs., second half-year. Tu Th, 10; W, 4.

135. Teachers' Training Course. Associate Professor RICHARDSON.

Problems in teaching Latin; estimates of text-books; examination of questions in pronunciation and syntax; exercises in teaching preparatory authors.

3 hrs., second half-year. M W F, 2. Additional prerequisite: senior or graduate standing.

139. Roman Comedy. Assistant Professor DEUTSCH.

Selected plays of Plautus and Terence. Study of the language and versification, and of the poet's relations to the sources and to earlier comedy, with some consideration of the customs of the Roman stage.

3 hrs., second half-year. Tu Th, 9, and a third hour.

140A. Latin Grammar: Forms; Syntax of the Noun. Assistant Professor NUTTING.

Lectures, with occasional tests, on the forms of declension and conjugation and on the syntax of the cases.

2 hrs., second half-year. M W, 1.

141. Palaeography and Text Criticism. Assistant Professor PRICE.

Lectures on palaeography and practice in reading fac-similes and original manuscripts. Practical exercises conducted by students.

3 hrs., second half-year. Tu Th, 3, and a third hour.

151. Cicero: Tusculan Disputations. Assistant Professor NUTTING.

Criticism and interpretation.

3 hrs., first half-year. M W F, 3.

154. Ancient Rome. Assistant Professor WASHBURN.

Illustrated lectures on the topography and monuments of Ancient Rome. Collateral reading and reports.

2 hrs., second half-year. Tu Th, 11.

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177. **Life of Caesar.** Assistant Professor DEUTSCH.

Caesar's career will be studied from the sources; Suetonius' life will be read in class, while selections from other Latin authors will be read privately.

3 hrs., first half-year. Tu Th, 9, and a third hour.

181. **Select Titles from the Digest.** Professor MERRILL.

Books 18, 19, 20, 21, and 13.7 being part of the law of Contracts.

3 hrs., second half-year, to be arranged. The consent of the instructor must be obtained before registration in this course.

188. **Caesar and Nepos.** Assistant Professor NUTTING.

A study of these authors from the point of view of their adaptability for use in the high school course. Extensive reading in the Latin texts.

2 hrs., first half-year. M W, 1.

192. **Pompeii.** Assistant Professor WASHBURN.

Illustrated lectures on the monuments of the city. Collateral reading with reports.

2 hrs., first half-year. Tu Th, 11.

FREE ELECTIVE COURSE

22. **Masterpieces of Roman Literature.** Dr. PETERSSON.

Lectures and private reading. No knowledge of any foreign language is required.

2 hrs., second half-year. M W, 9. Prerequisite: junior standing in any college.

GRADUATE COURSES

230A–230B. **Latin Verse Composition.** Associate Professor RICHARDSON.

Writing of Latin hexameters, elegiacs, sapphics, asclepiads and alcaics. Seniors who have completed course 112A–112B may be admitted with the consent of the instructor.

1 hr., throughout the year. F, 3.

234A–234B. **Latin Seminar.** Professor MERRILL.

Criticism and interpretation of the Silvae of Statius. Training in philological method and in textual criticism. Lectures, exercises, and original papers.

3 hrs., throughout the year; 3 units first half-year; 5 units second half-year. S, 10–12; Th, 4. Required normally of all candidates for higher degrees who make Latin their major subject.

259A–259B. **Seminar in Latin Syntax.** Assistant Professor NUTTING.

The work of the first half-year will be mainly the collection of material; the second half-year will be devoted to seminar exercises. A reading knowledge of German is essential.

2 hrs., throughout the year, to be arranged.

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266. Catiline's Conspiracy. Assistant Professor NUTTING.

A study, from the sources, of the causes and events of Catiline's Conspiracy. The data will be selected in part through private reading.

3 hrs., second half-year. M W F, 3.

283A–283B. Seminar in Classical Archaeology. Assistant Professor WASHBURN.

Greek and Italian vases as documents in ancient history. Such problems as the Dorian invasion, Ionia, colonizing, the Etruscans, the Gallic invasion, trade-routes, and commerce, will be studied in connection with this course. Required of all candidates for higher degrees who make classical archaeology their major subject.

2 hrs., throughout the year. S, 9–11.

285. Advanced Latin Composition. Assistant Professor NUTTING.

From the point of view of teaching the subject. Practice in making English exercises for translation into Latin. Collection of material bearing on the style and idiom of Cicero.

1 hr., either half-year. F, 1.

291. Cicero. Dr. PETERSSON.

A study of Cicero's character and his political and literary attitude as influenced by events in his life. The course will endeavor to give a comprehensive view of Cicero's life and works, and to afford training in investigation. Each member of the class will be required to write a brief essay.

3 hrs., first half-year. Tu Th, 3, and a third hour.

SUSPENDED COURSES

The following courses will not be given in 1917–18: 108, Cicero's Letters; 115, Elegiac Poetry; 118A, Tacitus, Histories; 118B, Suetonius; 120, Martial and Juvenal; 124, Early Latin; 126, Quintilian; 131, Roman Satire; 133, Cicero, De Finibus; 137, Catullus; 140B, Latin Grammar, Syntax; 143, Roman Religion; 153, Roman Private Life; 156, Roman Tragedy; 162, Plautus; 169 Statius and Ausonius; 171, Livy; 173, Aeneid of Virgil; 176, Roman Novel; 189, Introduction to Classical Archaeology; 191, Cicero; 193, Virgil from the Monuments; 195, Prose Literature of Empire; 260, Roman Epigraphy; 277, Life of Caesar.

LINGUISTICS

101A. Phonetics. Assistant Professor DEMETER.

An introduction to the general principles of phonetics, with illustrations from English, French, and German. Recommended for advanced students who intend to take courses in philology, ancient or modern, or in linguistic theory.

2 hrs, first half-year. M W, 11.

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MATHEMATICS

MELLEN W. HASKELL, Ph.D., Professor of Mathematics.
GEORGE C. EDWARDS, Ph.B., Professor of Mathematics.
DERRICK N. LEHMER, Ph.D., Associate Professor of Mathematics.
CHARLES A. NOBLE, Ph.D., Associate Professor of Mathematics.
THOMAS M. PUTNAM, Ph.D., Associate Professor of Mathematics.
JOHN H. MCDONALD, Ph.D., Assistant Professor of Mathematics.
BALDWIN M. WOODS, Ph.D., Assistant Professor of Theoretical Mechanics.
BENJAMIN A. BERNSTEIN, Ph.D., Instructor of Mathematics.
FRANK IRWIN, Ph.D., Instructor in Mathematics.
THOMAS BUCK, Ph.D., Instructor in Mathematics.
HARRY N. WRIGHT, Ph.D., Instructor in Mathematics.
FRANK R. MORRIS, M.A., Teaching Fellow in Mathematics.
CLYDE WOLFE, M.A., Teaching Fellow in Mathematics.

Honor-students in the Upper Division.—Students who wish to become honor-students in mathematics must obtain permission from the department. They should elect courses 5, 6, 8, and 9 in the lower division. The specific courses in preparation for the final examination are 109A–109B, 111, 112, 114, and 119. But work in course 199, in which honor-students are expected to enroll throughout the upper division, may, with the approval of the department, be substituted for one or more of these courses.

All candidates for honors in mathematics will be expected to pass a general examination in that subject in lieu of the examinations of the special courses of their final half-year. The examination will be partly written and partly oral, and will include the following subjects:

1. Geometry of the plane and of space, both analytic and projective.
2. The differential and integral calculus, including the elements of differential equations.
3. Algebra: theory of algebraic equations.

LOWER DIVISION COURSES

A. Algebra.

3 hrs., either half-year. Tu Th S, 9, 10, 11. Course A is substantially equivalent to matriculation subjects $4a^1$ and $4a^2$.

B. Solid and Spherical Geometry. Assistant Professor MCDONALD.

2 hrs., either half-year, Tu Th, 9. Course B is equivalent to matriculation subject $4b$.

C. Plane and Spherical Trigonometry.

3 hrs., either half-year. Tu Th S, 9, 10, 11. Course C includes matriculation subject $12a^2$. Prerequisite: course A or matriculation subject $4a^1$.

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E. Algebra and Plane Trigonometry. Mr WOLFE.

This course is planned for the needs of students in the College of Commerce.

4 hrs., either half-year. M Tu Th F, 10.

1. Elements of Analysis. Associate Professor LEHMER.

Fundamental ideas of algebra, trigonometry, analytic geometry, and differential and integral calculus.

5 hrs., first half-year. M Tu W Th F, 2. Students who elect course 1 are required to present 5 units of mathematics instead of 6 for the junior certificate.

2. Mathematical Theory of Investment.
Associate Professor PUTNAM, Dr. WRIGHT and Mr. WOLFE.

4 hrs., either half-year. M Tu Th F, 10. Prerequisite: course E (or its equivalent). Prescribed in the College of Commerce.

3–4. Elements of Analysis, with Applications.

A practical two-year course in algebra, analytic geometry, the differential and integral calculus, adapted particularly to the needs of students in engineering, architecture, and chemistry.

3A–3B. Plane Analytic Geometry and Differential Calculus.

3 hrs., throughout the year, beginning either half-year. M W F, 8, 9, 10. 3B will be given first half-year, Tu Th S, 8.

3AB. Plane Analytic Geometry and Differential Calculus.

6 hrs., second half-year. Daily at 10. For freshmen entering in January only.

4A–4B. Solid Analytic Geometry and Integral Calculus.

3 hrs., throughout the year, beginning either half-year. M W F, 8, 9, 10. 4B will be given first half-year. Tu Th S, 8.

5. Plane Analytic Geometry. Professor EDWARDS.

The straight line, the circle, and the conic sections, including a discussion of the general equation of the second degree.

3 hrs., either half-year. M W F, 2. Prerequisite: course C.

6. Introduction to Projective Geometry.
Associate Professor LEHMER and Dr. WRIGHT.

3 hrs., either half-year. First half-year, M W F, 10; second half-year, M W F, 3. Course 6 includes matriculation subject 12a[1]. Required of all candidates for the teacher's recommendation.

8. Advanced Algebra. Professor EDWARDS.

Permutations and combinations, probabilities, convergency of series, complex numbers.

3 hrs., either half-year. M W F, 3.

9. Introduction to Differential and Integral Calculus.
Professor EDWARDS.

3 hrs., either half-year. First half-year, M W F, 9; second half-year, M W F, 10. Prerequisite: course 5.

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UPPER DIVISION COURSES

These courses are open to students in the lower division who have the necessary prerequisites.

101A–101B. Elementary Geometry for Advanced Students.
Professor HASKELL.

An historical and critical review of elementary geometry from the earliest times to the present, with particular emphasis on recent developments.

3 hrs., throughout the year. M W F, 9. Prerequisite: courses 5 and 6.

102A–102B. Elementary Algebra and Analysis for Advanced Students.
Associate Professor NOBLE.

An historical and critical account of the development of algebra and analysis from the Middle Ages to the present, with particular reference to modern points of view.

3 hrs., throughout the year. M W F, 2. Prerequisite: courses 8 and 9.

109A–109B. Differential and Integral Calculus. Advanced Course.
Associate Professor PUTNAM and Assistant Professor MCDONALD.

3 hrs., throughout the year, beginning either half-year; M W F 10. 109B will be given first half-year, M W F, 9. Prerequisite: course 9.

110A. Advanced Calculus. Assistant Professor WOODS and Dr. BUCK.

The differential equations, both ordinary and partial, which occur most frequently in the applications, with special stress on approximate numerical solutions. Primarily for students of engineering.

2 hrs., first half-year. Tu Th, 8, 9.

110B. Advanced Calculus. Dr. BUCK.

Definite integrals, multiple integrals, theory and use of infinite series, applications to practical problems. Primarily for students of engineering.

2 hrs., second half-year. Tu Th, 8.

111. Determinants and Theory of Numerical Equations.
Assistant Professor MCDONALD.

3 hrs., first half-year. M W F, 3.

112. Analytic Geometry of Three Dimensions.
Associate Professor PUTNAM.

3 hrs., first half-year. M W F, 2.

*113. Synthetic Projective Geometry Associate Professor LEHMER.

3 hrs., first half-year. M W F, 9. Prerequisite: course 6.

* Not to be given 1917–18. Will be offered 1918–19.

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114. Analytic Geometry. (Advanced Course.)
Associate Professor PUTNAM.
Introduction to modern methods in analytic geometry.
3 hrs., second half-year. M W F, 2. Prerequisite: course 5.

115. Theory of Numbers. Dr. WRIGHT.
Elementary properties of numbers, theory of congruences, residues of powers, primitive roots, quadratic forms.
3 hrs., second half-year. M W F, 9.

116. Mathematical Theory of Investment. Assistant Professor WOODS.
Intended primarily for juniors and seniors in the engineering colleges.
2 hrs., second half-year. M W, 11. Prerequisite: course 4A–4B or its equivalent.

117. Calculus of Finite Differences. Dr. BERNSTEIN.
2 hrs., second half-year. Tu Th, 8. Prerequisite: course 9.

118A–118B. Algebra of Logic. Dr. BERNSTEIN.
3 hrs., throughout the year. M W F, 9.

119. Introduction to Differential Equations. Associate Professor NOBLE.
3 hrs., second half-year. M W F, 3.

120. Theory of Probabilities. Dr. BERNSTEIN.
3 hrs., first half-year. M W F, 8. Prerequisite: course 9.

*122. History of Mathematics. Professor HASKELL.
2 hrs., second half-year. Tu Th, 11.

125. Higher Plane Curves. Professor HASKELL.
3 hrs., first half-year. M W F, 10. Prerequisite: course 114. Open only to honor-students and to graduates.

199A–199B. Honor-conference.
Individual weekly conferences with honor-students for their guidance in reading and research.
Throughout the year. Hours and credit to be arranged.

GRADUATE COURSES

201–202. Mathematical Seminar. Assistant Professor MCDONALD.
Advanced students will be guided in reading and research; frequent reports will be required. The particular aim of the seminar will be the training of students in independent investigation.
Tu Th, 10, and special appointments. Credit value, 3 to 5 units each half-year, dependent on amount and quality of work done.

* Not to be given, 1917–18. Will be offered 1918–19.

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*212. Theory of Algebraic Surfaces. Associate Professor LEHMER.

218A–218B. Logic of Mathematics. Dr. BERNSTEIN.
Analysis of the foundation principles of geometry and algebra.
2 hrs., throughout the year. Tu Th, 9. Designed especially for teachers and prospective teachers of mathematics.

221A–221B. Introduction to Modern Higher Algebra. Dr. IRWIN.
3 hrs., throughout the year. M W F, 3.

*222. Theory of Functions of a Real Variable. Dr. IRWIN.

223. Partial Differential Equations. Assistant Professor MCDONALD.
The important partial differential equations of applied mathematics.
3 hrs., second half-year. M W F, 3.

224A–224B. Theory of Functions of a Complex Variable. Dr. BUCK.
3 hrs., throughout the year. M W F, 2.

225. Elliptic Functions. Associate Professor NOBLE.
3 hrs., first half-year. M W F, 3.

226. Elliptic Modular Functions. Professor HASKELL.
3 hrs., second half-year. M W F, 10.

*227. Differential Geometry. Dr. BUCK.
Application of differential and integral calculus to curves and surfaces.

231. Theory of Numbers. Associate Professor LEHMER.
3 hrs., second half-year. M W F, 10.

*233. Theory of Groups. Part I. Associate Professor PUTNAM.
Theory of groups of substitutions, with application to the theory of algebraic equations.
3 hrs., first half-year. M W F, 2.

*234. Theory of Groups. Part II. Professor HASKELL.
Elements of continuous groups, with application to the theory of differential equations.
3 hrs., second half-year. M W F, 2.

235. Seminar in Group-theory. Professor HASKELL.
Klein's Lectures on the Icosahedron and the equation of the fifth degree.
Hours and credit to be arranged.

*237. Calculus of Variations. Associate Professor NOBLE.

*Not to be given, 1917-18. Will be offered 1918-19.

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250. Mathematical Colloquium.

Meetings for the presentation of original work by members of the staff and graduate students. Open to graduate students. No credit.

Alternate Tuesdays at 3.

251. Special Advanced Study and Research. The STAFF

Hours and credit to be arranged.

COURSES IN OTHER DEPARTMENTS

Analytic Mechanics. [See Physics 105.] Professor SLATE.

Method of Least Squares. [See Astronomy 107.] Dr. EINARSSON.

Interpolation, Use of Tables and Mechanical Quadratures. [See Astronomy 108.] Dr. EINARSSON.

Theoretical Astronomy. [See Astronomy 206.] Professor LEUSCHNER.

Descriptive Geometry. [See Drawing 3.]
Associate Professor KOWER, Assistant Professor WYTHE, and Mr. BROWER.

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MECHANICAL AND ELECTRICAL ENGINEERING

CLARENCE L. CORY, M.M.E., D.Eng., John W. Mackay, Jr. Professor of Electrical Engineering, Consulting Electric Light and Heating Engineer, and Dean of the College of Mechanics.

JOSEPH N. LECONTE, M.M.E., Professor of Engineering Mechanics.

BENEDICT F. RABER, B.S., Associate Professor of Mechanical Engineering.

WILLIAM F. MARTIN, M.C.E., Assistant Professor of Engineering Mechanics.

REUBEN S. TOUR, M.S., Assistant Professor of Gas Engineering.

HERBERT B. LANGILLE, A.B., Assistant Professor of Machine Design and Mechanical Drawing.

FRED E. PERNOT, Ph.D., Assistant Professor of Electrical Engineering.

BALDWIN M. WOODS, Ph.D., Assistant Professor of Theoretical Mechanics.

LLOYD N. ROBINSON, B.E., Instructor in Electrical Engineering.

BLAKE R. VANLEER, B.S., M.E., Instructor in Mechanical Engineering.

GEORGE L. GREVES, M.S., Instructor in Electrical Engineering.

GEORGE E. COX, Assistant in Mechanics and Foreman of Woodwork.

JAMES GEORGE, Assistant in Mechanics and Foreman of Ironwork.

Fees.—Laboratory deposits in this department are at the rate of $5 a half-year for each laboratory or mechanical practice exercise a week, except that graduate students will be exempt from fees in graduate laboratory courses designated as research courses. The average amount returned to the student at the end of the half-year is about two-fifths of the deposit.

Honors.—Students will be recommended for honors on the basis of the work done in the regular curriculum of the senior year. Particular emphasis will be placed upon the thesis.

MECHANICAL ENGINEERING

LOWER DIVISION COURSES

1A. Elements of Steam Engineering. Assistant Professor TOUR.

Fundamental consideration of fuels, combustion, steam; boilers, furnaces, chimneys, etc.; steam engines, condensers, etc.

3 hrs., first half-year. Two sections: I, M W F, 8; II, M W F, 9. Prerequisite: Physics 1A–1B, Chemistry 1A–1B, Mathematics 3A–3B.

6A. Machine Design. Assistant Professor LANGILLE.

Elementary machine design. Work at the drawing board, supplemented by lectures upon the principles underlying machine design.

6 hrs., second half-year; 3 units. Two drafting sections: I, M F, 1–4; II, Tu Th, 1–4; lecture hour to be arranged. Prerequisite: Drawing 3D.

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8A. Mechanical Practice. Mr. Cox.

Shop work in wood, including pattern making.

6 hrs., first half-year; 2 units. Four sections: I M F, 1–4; II, Tu Th, 9–12; III, Tu Th, 1–4; IV, W, 1–4, and S, 8–11.

8B. Mechanical Practice. Mr. Cox.

Continuation of course 8A.

6 hrs., second half-year; 2 units. Four sections: I, M F, 1–4; II, Tu Th, 9–12; III, Tu Th, 1–4; IV, W, 1–4, S, 8–11.

9A. Mechanical Practice. Mr. George.

Shop work in iron, including machine work.

6 hrs., first half-year; 2 units. Four sections: I, M F, 1–4; II, Tu Th, 9–12; III, Tu Th, 1–4; IV, W, 1–4, and S, 8–11. Prerequisite: course 8A or 8B.

M Tu W Th F, 9.

9B. Mechanical Practice. Mr. George.

Continuation of course 9A.

6 hrs., second half-year; 2 units. Four sections: I, Tu Th, 9–12; II, Tu Th, 1–4; III, M F, 1–4; IV, W, 1–4, S, 8–11.

Note.—Properly qualified students in any college of the University may elect a total of one year of shop work such as course 8A, first half-year, followed by course 9A, second half-year.

UPPER DIVISION COURSES

101A–101B. Engineering Mechanics. Assistant Professor Martin.

Problems in theoretical and applied mechanics, selected to strengthen the student's practical mathematical working power; review of fundamental mathematical theorems and formulas. Open to all students who have some working power in differential and integral calculus.

2 hrs., throughout the year. M W, 11.

102A–102B. Engineering Mechanics.
Professor LeConte and Assistant Professor Martin.

Theoretical mechanics of engineering.

3 hrs., throughout the year. Four sections: I, M W F, 8 (mining students); II, M W F, 9 (mechanics students A–K); III, M W F, 9 (mechanics students L–Z); IV, M W F, 10 (C. E. students). Prerequisite: Mathematics 3A–3B, 4A–4B, or 9 and 109.

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103A. Hydraulics. Professor LECONTE.

The principles of hydraulics with special reference to their application in the development of power.

3 hrs., first half-year. M W F, 8. Prerequisite: course 102A–102B, or Physics 105A–105B.

103B. Hydraulic Machinery. Professor LECONTE.

Discussion of the theory underlying the design of hydraulic motors, pumps, and other apparatus operated through the agency of water.

3 hrs., second half-year. M W F, 8. Prerequisite: course 102A–102B, or Physics 105A–105B, and course 103A, or Civil Engineering 110.

103C–103D. Elementary and Practical Course in Hydraulics. Mr. VANLEER.

Practical problems upon cost of piping, well digging, selection of pumping machinery and central station pumping plants, windmills, etc. Reports upon visits to hydraulic installations; oral and written abstracts of engineering papers. Recitations.

2 hrs., throughout the year. Tu Th, 11. The class will be limited to 15. Course 102A–102B must precede or accompany this course.

104A–104B. Kinematics. Assistant Professor WOODS.

Theoretical: Motion without reference to the cause which produces it; pure mechanism or the mutual dependence of the movements in the parts of a machine. *Applied*: Application of the preceding to the various kinematic problems connected with machine design and construction, such as link-motion, transmission by rolling and sliding contact, teeth of wheels, cams, form and proportions of the steam-engine and other motors.

2 hrs., throughout the year. Tu Th, 8. Prerequisite: course 102A–102B. or Physics 105A–105B.

104C–104D. Kinematics. Assistant Professor LANGILLE.

Drafting and designing; to be taken only in conjunction with course 104A–104B.

3 hrs., throughout the year; 1 unit each half-year. W, 1–4.

105A. Thermodynamics. Associate Professor RABER.

Relations between heat and mechanical energy. Thermal properties of perfect gases, saturated vapors, and superheated vapors.

3 hrs., first half-year. M W F, 10. Prerequisite: course 102A–102B, or Physics 105A–105B.

105B. Heat Engines: Testing, Construction, and Operation. Associate Professor RABER.

Analysis of the cycles of steam, gas, oil, and air engines, and of refrigerating machinery, by means of the pressure, volume, and temperature; entropy diagrams. The effects of compounding, packeting, reheating, and superheating. Steam boilers, gas engines, gas producers, air compressors, and steam turbines. Methods of testing. Engine and boiler accessories.

3 hrs., second half-year. M W F, 10. Prerequisite: course 105A.

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106B. Machine Design. Assistant Professor LANGILLE.

Continuation of course 6A. Design of machine parts and finally of a typical machine suitable for illustrating the general principles of engineering design.

6 hrs., first half-year; 2 units. Two sections: I, M F, 1–4; II, Tu Th, 1–4. Prerequisite: course 6A.

106C. Advanced Machine Design. Assistant Professor LANGILLE.

A continuation of course 106B, and involving the complete design of a steam engine, air compressor or similar mechanism. Open as an elective course to students who have completed courses 6A and 106B.

6 hrs., second half-year; 2 units. M F, 1–4, or Tu Th, 1–4. Completion of courses 102A–102B, 104A–104B, 104C–104D is particularly desirable as a preparation for this course. Courses 104A and 104C may be taken concurrently.

107A–107B. Hydraulic Laboratory: Experimental Engineering. Mr. VANLEER.

The general principles of hydraulics, including methods of measuring water, calibration of instruments, meters and weirs; tests of pumps, turbines and water wheels.

3 hrs., throughout the year; 1 unit each half-year. Two sections: I, Tu, 1–4; II, Th, 1–4. Prerequisite: courses 103A, 103B, or 103C–103D or Civil Engineering 110, or may be taken concurrently with one of these courses.

107C–107D. Mechanical Laboratory: Experimental Engineering. Assistant Professor TOUR.

Calibration of instruments and auxiliary apparatus used in testing. Tests of steam engine, steam pump, gas engine, air compressor, boiler, etc. Steam calorimetry. Fuel testing.

3 hrs., throughout the year; 1 unit each half-year. Two sections: I, Tu, 1–4; II, Th, 1–4. Prerequisite: course 1A; should be taken in conjunction with courses 105A, 105B.

108B. Internal Combustion Engines. Assistant Professor TOUR.

Theoretical consideration of various cycles. Comparison and application of the Diesel and Otto cycle. Operation of internal combustion engines and their accessories.

2 hrs., second half-year. Tu Th, 9. Prerequisite: courses 1A and 105A.

109B. Steam Power Plant Design. Associate Professor RABER.

The design of a complete steam power plant and the formulation of specifications therefor.

2 hrs., second half-year, to be arranged. Prerequisite: course 1A.

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114. Thesis. The Staff.

For the regulations governing thesis work see the Circular of Information, Academic Departments. Candidates for B.S. who elect their thesis work in the department of mechanical and electrical engineering will register, during both half-years of the last or senior year, for course 114. Candidates who elect their thesis work in another department will register according to the announcement of that department.

2 units, either half-year.

125B. Fuel Testing. Assistant Professor Tour.

Physical tests, analyses and calorimetry of gaseous, liquid and solid fuels. Combustion and deductions from fuel tests in conjunction with tests of the products of combustion. May be taken without 125D. Lectures.

1 hr., second half-year, to be arranged. Prerequisite: course 1A.

125D. Fuel Testing. Laboratory. Assistant Professor Tour.

Course to accompany 125B, which latter must be taken in conjunction with this course.

3 hrs., second half-year; 1 unit. Prerequisite: course 1A.

126B. Steam Turbines. Associate Professor Raber.

Rotative heat power engines, and their auxiliaries; design of steam nozzles, of blading, and of governor details. Turbine operation illustrated by inspection trips to typical plants. Open to seniors and graduate students.

2 hrs., second half-year, to be arranged. Prerequisite: course 1A, and must be taken concurrently with course 105B.

GRADUATE COURSES

215A–215B. Advanced Problems in Engineering Mechanics and Hydraulics. Professor LeConte.

1 hr., throughout the year, to be arranged.

219. Mechanical Engineering: Research Laboratory. Associate Professor Raber and Assistant Professor Tour.

First half-year. Hours to be arranged. Prerequisite: courses 105A, 105B, and 107C–107D.

220. Gas Power Engineering. Associate Professor Raber.

The theory and design of gas, gasoline and oil engines; gas producer practice; the combustion of gaseous fuels.

3 hrs., second half-year, to be arranged. Prerequisite: courses 1A, 105A, and 105B; or the latter may be taken concurrently.

221. Aerodynamics. Assistant Professor Woods.

The principles of motion in a fluid as applied to the aeroplane, and to the design of its fundamental parts.

2 hrs., first half-year, to be arranged. Prerequisite: course 102, Mathematics 110.

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ELECTRICAL ENGINEERING

LOWER DIVISION COURSE

1B. Elements of Electrical Engineering. Assistant Professor PERNOT.

Open to sophomores in the engineering colleges, especially those who have had Mathematics 3A–3B and Physics 2C.

3 hrs., second half-year. Two sections: I, M W F, 8; II, M W F, 9.

UPPER DIVISION COURSES

100A. Direct Current Machinery. Mr. GREVES.

Theory, operating characteristics and uses of direct current machinery and equipment. For engineering students not registered in the College of Mechanics.

3 hrs., first half-year. Tu Th, 9; F, 1. Prerequisite: Mathematics 3A–3B, Physics 2C–2D.

100B. Alternating Current Machinery. Mr. GREVES.

A continuation of course 100A. Theory, operating characteristics and uses of alternating current machinery and equipment. For engineering students not registered in the College of Mechanics.

2 hrs., second half-year. Tu Th, 9. Prerequisite: course 100A.

100C. Electrical Laboratory: Direct Current Machinery. Mr. GREVES.

3 hrs., first half-year; 1 unit. W, 2–5. Course 100A must be taken concurrently.

100D. Electrical Laboratory: Alternating Current Machinery. Mr. GREVES.

3 hrs., second half-year; 1 unit. Th, 1–4. Course 100B must be taken concurrently.

110A–110B. Electrical Machinery and Construction. Professor CORY.

The construction and operation of electrical machinery, and its application to electric lighting and power distribution.

2 hrs., throughout the year. Tu Th, 11. Prerequisite: course 1B, Mathematics 4A–4B and Physics 2C–2D.

110C. Electrical Machinery and Construction: Laboratory. Assistant Professor PERNOT and Mr. ROBINSON.

3 hrs., second half-year; 1 unit. Course 110B must be taken concurrently. Three sections: I, W, 1–4; II, F, 1–4; III, S, 8–11.

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111A–111B. Alternating Currents and Alternating Current Machinery. Professor CORY.

The theory of the generation of single-phase and poly-phase alternating currents, the use of the complex quantity, and the calculation of the regulation and behavior of alternating current apparatus and transmission lines. The theory of the single-phase and poly-phase induction motor, synchronous motor, and rotary converter, and their effects and operation in transmission systems.

4 hrs., throughout the year. Tu Th, 9–11. Prerequisite: courses 110A–110B and 110C; Mechanics 102A–102B or Physics 105A–105B; Physics 107A–107B.

111C–111D. Alternating Currents and Alternating Current Machinery: Laboratory. Mr. ROBINSON and Mr. GREVES.

6 hrs., throughout the year; 3 units each half-year. Two sections: I, M, 1–7; II, Tu, 1–7. Prerequisite: course 110A–110B and 110C and Mechanics 102A–102B, or Physics 105A–105B and Physics 107A–107B.

114. Thesis. The STAFF.

For the regulations governing thesis work see the Circular of Information, Academic Departments. Candidates for B.S. who elect their thesis work in the department of mechanical and electrical engineering will register, during both half-years of the last or senior year, for course 114. Candidates who elect their thesis work in another department will register according to the announcevent of that department.

2 units, either half-year.

119A–119B. Elements of Electrical Design. Assistant Professor PERNOT.

Theoretical principles underlying the construction and operation of electrical apparatus; application of principles to practical design and the general problems connected with direct current and alternating current machinery.

3 hrs., throughout the year; 2 units each half-year. F, 1–4. Prerequisite: courses 1B and 110A–110B.

122A–122B. Special Problems in Electrical Engineering. The STAFF.

Throughout the year. Hours to be arranged.

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GRADUATE COURSES

Graduate students who wish to engage in advanced work in hydraulics, thermodynamics, experimental engineering, electrical engineering, or related subjects will be admitted to any of the courses offered, on giving evidence that they possess the fundamental knowledge which will enable them to profit by the instruction. They will also be given all possible assistance outside the lecture room in pursuit of advanced study and original investigation. A well equipped building is devoted to the work of these branches of engineering.

212A. Advanced Theoretical Electrical Engineering. Assistant Professor PERNOT.

Lectures on selected subjects of an advanced technical nature. Open to seniors and graduate students.

2 hrs., first half-year. M W, 11.

212C. Electrical Engineering: Research Laboratory. The STAFF.

First half-year. Hours to be arranged.

214. Electrical Traction. Mr. ROBINSON.

The application of electric motive power to railways. Motor equipments, speed-time curves, and schedules; economics of location and equipment. Open to senior and graduate students in electrical engineering.

3 hrs., first half-year; 3 units. M W F, 9.

216. Power Plant Engineering. Mr. ROBINSON.

Investigation of electric generating and sub-stations, high tension transmission and low tension distribution, preliminary engineering, economic location, and operation, including load curves and other controlling considerations.

2 hrs., second half-year; 2 units. Open to seniors and graduates who are taking or have taken the equivalent of Mechanics 103A, 103B, 105A, 105B, 110A–110B.

217. Electrical Oscillations, Line Surges, and Transmission Line Phenomena. Radio-Telegraphy. Assistant Professor PERNOT.

Open to seniors and graduate students. Lectures.

2 hrs., second half-year. M W, 11.

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GAS ENGINEERING

UPPER DIVISION COURSES

117B. Gas Engineering. Assistant Professor TOUR.

Methods and processes used in the manufacture of illuminating gas, including coal gas, carburetted water gas, and oil gas; construction and operation of gas manufacturing plants. Supplementary lectures on alternate Fridays by gas engineers of the Pacific Coast.

3 hrs., second half-year; 2 units. M W alt F, 11. Prerequisite: Mechanics 1A, course 118A–118B, or Chemistry 126, 111.

118A–118B. Gas Engineering Laboratory. Assistant Professor TOUR.

Analysis of illuminating gas. The calorific value of solid, liquid, and gaseous fuels. The determination of specific gravity. Photometry of gas illumination.

3 hrs., throughout the year; 1 unit each half-year. Hours to be arranged. Prerequisite: Chemistry 5 or equivalent.

120. Gas Engineering Laboratory. Assistant Professor TOUR.

Incidental tests such as for naphthalene, free carbon in tars, sulphur in purifying material, distillation of oil, etc.

3 hrs., first half-year; 1 unit. Hours to be arranged. Prerequisite: courses 117 and 118.

GRADUATE COURSE

218. Gas Engineering: Research Laboratory.
Associate Professor RABER and Assistant Professor TOUR.

First half-year. Hours to be arranged. Prerequisite: courses 117 and 118.

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MEDICAL SCHOOL

At present the instruction of the first one and one-half years of the medical course is given in Berkeley. The first year of this work may also be counted towards the bachelor's degree in the College of Letters and Science for those who have attained senior standing. See departments of anatomy, biochemistry and pharmacology, physiology, and pathology and bacteriology. For further information reference should be made to the special announcement of the Medical School.

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MILITARY SCIENCE AND TACTICS

JOHN T. NANCE, Major, U. S. Army, Retired, Graduate U. S. Military Academy, Professor of Military Science and Tactics.

TRUMAN D. THORPE, First Lieutenant, U. S. Army, Retired, Graduate U. S. Military Academy, Assistant Professor of Military Science and Tactics.

[2]GEORGE E. DICKIE, B.L., Instructor in Military Science and Tactics.

The courses in military training are those prescribed by the War Department for infantry units of the reserve officers' training corps. The United States furnishes arms, equipments, and uniforms for students belonging to such units.

The primary object of establishing units of the reserve officers' training corps is to qualify, by systematic and standard methods of training, students at civil educational institutions for reserve officers. The system of instruction prescribed presents to these students a standardized measure of that military training which is necessary in order to prepare them to perform intelligently the duties of commissioned officers in the military forces of the United States, and it enables them to be thus trained with the least practicable interference with their civil careers. It should be the aim of every educational institution to maintain one or more units of the reserve officers' training corps in order that in time of national emergency there may be a sufficient number of educated men, trained in military science and tactics, to officer and lead intelligently the units of the large armies upon which the safety of the country will depend. The extent to which this object is accomplished will be the measure of the success of the reserve officers' training corps.

The course of training provides that the cadet officers and non-commissioned officers participate in the administration and training and share the responsibility therefor. The course is designed to train leaders of platoons in infantry companies. The platoon cannot be considered apart from larger units of which it forms a part. Intelligent teamwork depends on the leaders of smaller tactical units understanding the working of the larger units of their own arm, alone or in combination with other arms. The student upon graduation should know what is required of a platoon from the point of view of the company commander, and understand clearly the interior economy of a company. He should know what is demanded of the soldier as an individual, and he should have some idea of the tactical handling of a battalion, of which his company is a smaller unit.

The courses are divided into two groups, the lower division or basic courses and the upper division or advanced courses.

[2] In residence second half-year only, 1917–18.

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LOWER DIVISION COURSES

The lower division or basic courses are prescribed for all able-bodied male undergraduates who are citizens of the United States, and under twenty-four years of age at admission to the University as students. A first-year or second-year student claiming exemption because of physical disability, non-citizenship or age will present to the Department of Military Science and Tactics a petition, on the prescribed form, for such exemption. Pending action on his petition the student will enroll in the courses prescribed for his year and enter upon the work of such courses.

1A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Physical drill, infantry drill, care of rifle and equipment, rifle firing.

2 hrs., and, for each student, one afternoon period (to be announced) for gallery practice, either half-year; ½ unit. M W, 11.

1B. Military Art (Theoretical).
Assistant Professor THORPE and Cadet Officers.

Recitations and conferences on infantry drill regulations (to include the school of the company), military organization, firing manual, personal hygiene, camp sanitation, military policy.

1 hr., either half-year; 1 unit. W, 4.

2A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Physical drill, infantry drill, care of rifle and equipment, rifle firing, intrenchment, first-aid.

2 hrs., and, for each student, one Saturday (to be announced) for target practice, either half-year; ½ unit. M W, 11.

2B. Military Art (Theoretical).
Assistant Professor THORPE and Cadet Officers.

Recitations and conferences on map reading, service of security, service of information, combat.

1 hr., either half-year; 1 unit. W, 4.

3A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Physical drill, infantry drill, care of rifle and equipment, rifle firing, intrenchment, first-aid.

2 hrs., and, for each student, one Saturday (to be announced) for target practice, either half-year; ½ unit. M W, 11.

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3B. Military Art (Theoretical). Professor NANCE and Cadet Officers.

Recitations and conferences on infantry drill regulations (school of the battalion and combat), firing manual, camp sanitation and camping expedients, map reading, military policy.

1 hr., either half-year; 1 unit. W, 4.

4A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Physical drill, infantry drill, care of rifle and equipment, rifle firing, intrenchment, first-aid, signaling, sand-table work.

2 hrs., and, for each student, one Saturday (to be announced) for target practice; ½ unit. M W, 11.

4B. Military Art (Theoretical). Professor NANCE and Cadet Officers.

Recitations or conferences on service of security, service of information, marches, camps, military history; solution of map problems in minor tactics.

1 hr., either half-year; 1 unit. W, 4.

UPPER DIVISION COURSES

The upper division or advanced courses are prescribed for such third-year and fourth-year students as have completed the basic courses and elect to continue their military training and who are appointed officers or non-commissioned officers of University Cadets.

Any member of the senior division (of the Reserve Officers' Training Corps) who has completed two academic years of service in that division, who has been selected for further military training by the president of the institution and the professor of military science and tactics, and who executes the following written agreement, will be entitled, while not subsisted in kind, to the commutation of subsistence fixed by the Secretary of War in accordance with law:

....., 191....

In consideration of commutation of subsistence to be furnished me in accordance with law, I hereby agree to continue in the Reserve Officers' Training Corps during the remainder of my course in(Institution), to devote five hours per week during such period to the military training prescribed, and to pursue the courses of camp training during such period, prescribed by the Secretary of War.

.....

Witness:

The training camps referred to in the preceding paragraph are the two to be held during the summer vacation periods, following the student's third-year and fourth-year service in the unit. The United States furnishes field uniforms, transportation and subsistence for students attending the training camps.

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The captains, lieutenants and sergeants and, so far as practicable, the corporals of University Cadets will be appointed from members of the junior and senior classes. It is desired to give the student entering the advanced course training in a responsible position.

Students desiring to take military training as their major subject should consult the Department at the beginning of their junior year.

Third Year

105A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Practice in duties of sergeants and corporals in infantry and physical drills, and exercises in rifle firing, first-aid, signaling, intrenchment and sand-table work in connection with courses 1A, 2A, 3A, and 4A. Practice in military sketching.

3 hrs. (2 hrs., and 4 half-day periods), either half-year; 1 unit. M W, 11; and Th, 1–5, fourth-seventh weeks.

105B. Military Art (Theoretical). Assistant Professor THORPE.

Conferences, study and solution of map problems and map maneuvers; exercises in company administration; conferences on military history.

2 hrs. (1 hr., and 5 three-hour periods), first half-year; 2 units. Th, 3; and Th, 1–4, eighth-twelfth weeks.

106A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Continuation of course 105A.

3 hrs. (2 hrs., and 4 half-day periods), either half-year; 1 unit. M W, 11; and Th, 1–5, fourth-seventh weeks.

106B. Military Art (Theoretical). Assistant Professor THORPE.

Conferences on minor tactics, international law, property accountability, and method of obtaining supplies and equipment; map problems; map maneuvers.

2 hrs. (1 hr. and 5 three-hour periods), second half-year; 2 units. Th, 3; and Th, 1–4, eighth-twelfth weeks.

Fourth Year

107A. Military Art (Practical).
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Practice in duties of captains, lieutenants and sergeants in infantry and physical drills, and exercises in rifle firing, first-aid, signaling, intrenchment and sand-table work in connection with courses 1A, 2A, 3A, and 4A. Practice in military sketching.

3 hrs. (2 hrs. and 4 half-day periods), either half-year; 1 unit. M W, 11; and Tu, 1–5, fourth-seventh weeks.

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107B. **Military Art (Theoretical).**
Professor NANCE and Assistant Professor THORPE.

Conferences on court-martial proceedings; international relations of America; growth of principles of international law embodied in American diplomacy, legislation and treaties; psychology of war; general principles of strategy. Study and solution of map problems involving tactical handling of small forces, all arms combined. Map maneuvers.

1 hr., first half-year; 1 unit. Tu, 3, eighth-eleventh weeks; Tu, 1–4, twelfth-fifteenth weeks.

107C. **Military Art (Teaching).**
Assistant Professor THORPE and Assistants.

Practice in teaching courses 1B, 2B, or 3B, 4B.

1 hr., first half-year; 1 unit. W, 4.

108A. **Military Art (Practical).**
Professor NANCE, Assistant Professor THORPE, Mr. DICKIE, and Assistants.

Continuation of course 107A.

3 hrs. (2 hrs. and 4 half-day periods), either half-year; 1 unit. M W, 11; and Tu, 1–5, fourth-seventh weeks.

108B. **Military Art (Theoretical).**
Professor NANCE and Assistant Professor THORPE.

Lectures and conferences on military history and policy; rifle in war; solution of map problems; map maneuvers.

1 hr., second half-year; 1 unit. Tu, 3, eighth-eleventh weeks; Tu, 1–4, twelfth-fifteenth weeks.

108C. **Military Art (Teaching).**
Assistant Professor THORPE and Assistants.

Practice in teaching courses 1B, 2B, or 3B, 4B.

1 hr., second half-year; 1 unit. W, 4.

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MINING AND METALLURGY

ANDREW C. LAWSON, Ph.D., Professor of Mineralogy and Geology, and Dean of the College of Mining.

FRANK H. PROBERT, A.R.S.M., Professor of Mining.

WALTER S. WEEKS, A.B., B.S., M.E., Associate Professor of Mining.

ERNEST A. HERSAM, B.S., Associate Professor of Metallurgy.

WALTER S. MORLEY, B.S., Assistant Professor of Metallurgy.

LESTER C. UREN, B.S., Assistant Professor of Mining.

Honors.—Students will be recommended for honors at graduation on the basis of the quality of work done in the regular curriculum of the senior year. Particular emphasis will be placed upon student's capacity for original work.

Vacation Work.—All students are required to work eight weeks, prior to senior standing, in a mine, mill, smelter, or oil field, of which two weeks shall be spent in collecting data for a report to be submitted to the Mining Department. Two units of credit will be given for this report.

For the regulations governing thesis work, see Circular of Information, Academic Departments. Candidates for B.S. in mining, metallurgical or petroleum engineering may, with the approval of the study-lists committee, submit a thesis based on field studies.

MINING

There are no laboratory fees in this department.

LOWER DIVISION COURSES

1A. Mine Surveying and Mapping.
Associate Professor WEEKS and Assistant Professor UREN.

Surface and underground mine surveys; methods of traversing and collecting details. Preparation of mine maps from survey data, and methods of representing geological and other features on mine maps. Lectures, field and drafting-room practice.

9 hrs., first half-year; 3 units. Tu Th, 9–12; W, 1–4. Prerequisite: Civil Engineering 1A–1B, 3.

1B. Mine Mapping. Assistant Professor UREN.

Continuation of course 1. Graphic records of engineering data; stoping charts, sampling diagrams, and bore-hole logs. Use of special instruments. An intimate study of the several types of mine models.

3 hrs., second half-year; 1 unit. W, 1–4. Prerequisite: course 1.

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5. Engineering Drawing. Assistant Professor UREN.

Drafting-room practice, supplemented by occasional lectures, designed to meet the needs of mining students. Lettering; orthographic projection; preparation of working drawings, metallurgical flow sheets and geological sections; graphical methods of representing engineering data; copying processes.

6 hrs., second half-year; 2 units. M F, 1–4.

UPPER DIVISION COURSES

101A. Mine Development. Professor PROBERT.

Preliminary development, prospect and assessment work; choice of permanent entry; shaft sinking, tunneling, underground exploration. Elements of supports for mine excavations.

3 hrs., first half-year. M W F, 9. Prerequisite: course 103; Mechanics 102A–102B or Physics 105A–105B.

101B. Mining Methods. Professor PROBERT.

Discussion of factors influencing choice of method. Modern practice in exploitation of veins and massive deposits.

2 hrs., second half-year. M W, 9. Prerequisite: course 101A.

103. Exploration and Surface Mining. Associate Professor WEEKS.

Lectures on open-pit and placer mining, churn and diamond drilling, use of explosives and breaking of ground. Laboratory instruction in types of rock drills, sharpening steel, panning, and magnetic surveying.

5 hrs., second half-year; 3 units. Laboratory, Tu, 1–4; lectures, M W, 10. Prerequisite: Geology 1A, Mineralogy 1A, 1B.

105. Mine Equipment. Associate Professor WEEKS.

General discussion of power and mine equipment; transportation; hoisting, pumping, ventilating, and lighting.

3 hrs., second half-year. Tu Th F, 9. Prerequisite: course 101A, Mechanics 1A, 102A–102B, Electrical Engineering 100AB–100CD, Civil Engineering 108A. Course 111B to be taken concurrently.

107. Economics of Mining. Professor PROBERT.

The economic operation of a mine; mining company incorporation and organization; mining investments; capital in mining; labor in mining; mine taxation; conservation of mineral resources; marketing ores and metals; production and consumption of metals; relation of the mining industry to other industries.

2 hrs., first half-year. M W, 10. Course 101A to be taken concurrently.

109. Mine Cost-Accounting. Assistant Professor UREN.

Lectures on mine accounting and cost-keeping from an engineering standpoint. Payment of workmen; purchase and distribution of mine supplies; production records; administrative reports; methods of filing and preparing engineering and statistical data.

2 hrs., second half-year. Tu Th, 8. To be taken concurrently with course 101B.

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111A. Mining Machinery: Compressed Air. Associate Professor WEEKS.

Lectures, computations and laboratory. The compression of air and use of compressed air for mining purposes.

6 hrs., first half-year; 3 units. M Tu, 1–4. Prerequisite: Mechanics 1A, Electrical Engineering 100AB–100CD.

111B. Mining Machinery and Supplies. Associate Professor WEEKS.

Lectures, computations and laboratory. Power, mine ventilation, pumping, lighting, signalling, explosives, etc.

6 hrs., second half-year; 3 units. M W, 1–4. Prerequisite: course 111A; course 105 to be taken concurrently.

117. Thesis. (See general statement concerning required vacation work, above.)

In special cases a student may, with the approval of the study-lists committee, submit as a thesis a piece of work in any department in which he is qualified to pursue advanced studies.

2 units, either half-year.

NOTE.—Mining law is given in the Department of Jurisprudence (see Jurisprudence 216).

A course in mining hygiene (Hygiene 8), including first aid, mine sanitation, and rescue work is given by the Department of Hygiene, and is required of mining students.

GRADUATE COURSES

201. Research in Mining Practice. Associate Professor WEEKS.

First half-year; hours and credit to be arranged. Prerequisite: courses 101A, 101B, 105 and 111A, 111B.

203A–203B. Seminar in Mining. Professor PROBERT.

Discussion of current mining literature and problems.

1 hr., throughout the year. M, 4. Prerequisite: senior standing in the College of Mining.

205. Mine Valuation. Professor PROBERT.

Lectures on the examination, sampling and valuation of mines.

2 hrs., second half-year. M W, 11. Prerequisite: courses 101A, 101B, and 105. Open also to properly qualified seniors who are taking courses 101B and 105.

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PETROLEUM ENGINEERING

UPPER DIVISION COURSES

115. Methods of Producing Petroleum. Assistant Professor UREN.

Prospecting for oil. Drilling and controlling oil wells. Methods of extracting oil and gas from wells.

2 hrs., first half-year. Tu Th, 11. Prerequisite: senior standing in any engineering college.

119. Preliminary Refining, Transporting and Storing of Petroleum. Assistant Professor UREN.

Methods of separating sand, water, and gas from oil. Pipe-lines, tank-cars and steamers; reservoirs and tanks. Selling methods and control of prices and production. Economics of the oil industry. Valuation of oil lands. Lectures.

2 hrs., second half-year. Tu Th, 11. Prerequisite: senior standing in any engineering college.

123. Petroleum Engineering Laboratory. Assistant Professor UREN.

Investigation of special problems in the production, transportation and storage of petroleum. Practice in gauging and testing petroleum.

6 hrs., first half-year; 2 units. Th F, 1–4. Prerequisite: Mechanics 1A, Electrical Engineering 100AB–100CD. Course 115 to be taken concurrently.

125. Petroleum Cost-Accounting. Assistant Professor UREN.

Oil field cost-keeping and accounting methods. Payment of workmen; purchase and distribution of supplies; production records and administrative reports.

1 hr., first half-year. F, 10. To be taken only in conjunction with course 115.

127. Utilization of Petroleum and its Products. Assistant Professor UREN.

Use of petroleum and its derivatives as fuels; mineral oil lubricants, their characteristics and uses; refined distillates and their uses in furnishing light and heat; asphalt and its uses in paving and structural work; the mineral waxes and their uses. Lectures.

1 hr., first half-year. M, 11. Prerequisite: junior standing in an engineering college.

129. Production and Utilization of Natural Gas. Assistant Professor UREN.

Control and management of gas wells; separation of gas from oil; transportation and storing natural gas; utilization of natural gas in developing light, heat, and power; separating gasoline from natural gas.

1 hr., second half-year. F, 9. Prerequisite: course 115.

131. Thesis or Summer Work. (See general statement concerning required vacation work, above.)

2 units, either half-year.

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METALLURGY

Laboratory Fees.—Laboratory fees are $15 per half-year in each of the laboratory courses 2, 104A, 104B, 110A, 110B, and 114. At the end of the half-year any unconsumed balance is returned to the student after deducting the cost of materials actually used and the breakage of apparatus.

LOWER DIVISION COURSE

2. Wet Assaying. Assistant Professor MORLEY.

The principles and practice of wet assaying and volumetric analysis, applied to the products of mine, mill, and smelter.

7 hrs., second half-year; 3 units. M, 10; Tu Th, 1–4. Prerequisite: Chemistry 1A–1B.

UPPER DIVISION COURSES

102. General Metallurgy. Associate Professor HERSAM.

The study of ores from a metallurgical standpoint. Sorting, concentrating, handling, sampling, and valuing ores and ore products; slags, fluxes and refractory materials. Metallurgical practices and the outline of standard processes of treatment.

2 hrs., first half-year. Tu Th, 8. Prerequisite: course 2, or Chemistry 5 or 6A, Physics 1AB, 2CD, Mineralogy 1A, 1B.

104A. Fire Assaying. Assistant Professor MORLEY.

Lectures and laboratory practice. The proper use and care of the balance. Cupellation and parting of gold and silver. Preparation of ore samples. Scorification and crucible assays of gold and silver ores.

7 hrs., first half-year; 3 units. M, 11, and M Tu, 1–4. Prerequisite: course 2, and Mineralogy 1A, 1B.

104B. Advanced Assaying. Assistant Professor MORLEY.

Lectures and laboratory practice in the assay of precious and base metal ores. Melting, refining and sampling of gold and silver bullion. The assay of alluvials for gold, silver, platinum and tin. Smelting practice and analysis of products.

6 hrs., second half-year; 2 units. M F, 1–4. Prerequisite: course 104A.

106. Metallurgy of Iron and Steel. Associate Professor HERSAM.

The ores of iron and the methods of their reduction. The production of pig iron, wrought iron, and the various grades of steel. The physical properties of structural iron and steel as related to chemical composition and metallurgical treatment.

2 hrs., second half-year. Tu Th, 10.

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108A. Ore-Dressing. Associate Professor HERSAM.

The mechanical treatment of ores; the leading practices relating to crushing, sizing, classification, amalgamation, flotation and the various processes of concentration; theory of mechanical separation; principles underlying the possibilities of ore separation.

2 hrs., first half-year. Tu Th, 10. Prerequisite: courses 102 and 104A.

108B. The Metallurgy of Gold and Silver. Associate Professor HERSAM.

Lectures on the milling and amalgamation of gold and silver ores. The cyanide and other processes of extracting precious metals. Roasting and chlorination. A detailed study of existing plants.

2 hrs., second half-year. Tu Th, 11. Prerequisite: course 108A.

110A. Ore-Dressing Laboratory. Associate Professor HERSAM.

The operations of ore-dressing. Practice in crushing, sampling, and concentrating the ores of gold, silver, and the base metals. Experimentation on a working scale.

6 hrs., first half-year; 2 units. Th F, 1–4. Prerequisite: course 102. Supplementary to course 108A.

110B. Metallurgical Laboratory. Associate Professor HERSAM.

Experiments in amalgamation, flotation and hydro-metallurgy of precious and base metal ores.

6 hrs., second half-year; 2 units. Th F, 1–4. Prerequisite: course 110A. Supplementary to course 108B.

112. Metallurgy of Lead and Copper. Assistant Professor MORLEY.

Methods of smelting lead and copper ores with particular reference to the gold and silver content. A study of furnaces and the principles in their construction.

2 hrs., first half-year. Tu Th, 11. Prerequisite: course 102.

116. Metallography. Assistant Professor MORLEY.

The microscopic structure of metals and alloys as related to their physical and chemical properties, with special attention to iron and steel. Practice in the use of the microscope as applied to the examination of polished and etched metallic surfaces. Instruction in photo-micrography. Lectures and laboratory.

4 hrs., either half-year; 2 units. W, 11 and 1–4. Prerequisite: course 106.

118. Theses. (See general statement concerning required vacation work, above.)

In special cases a student may, with the approval of the study-lists committee, submit as a thesis a piece of work in any department in which he is qualified to pursue advanced studies.

2 units, either half-year.

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GRADUATE COURSES

The foregoing undergraduate courses are open to graduate students whose previous preparation has fitted them to undertake the work.

202. The Metallurgy of the Less Common Metals.
Associate Professor HERSAM.

The metallurgical treatment of the ores of tin, zinc, antimony, arsenic, mercury, aluminum, and the platinum metals, including methods of reduction and refining these metals.

2 hrs., first half-year, to be arranged. Prerequisite: course 112.

210A-210B. Special Investigation in the Treatment of Ores.
Associate Professor HERSAM.

Programme of work to be arranged in each case.

Throughout the year. Prerequisite: course 110B.

216. Metallography. Assistant Professor MORLEY.

An extended study of the structure of iron and steel, including thermal analysis. The metallographic examination of the industrial alloys.

4 hrs., second half-year; 2 units. Th, 1–5. Prerequisite: course 116.

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MUSIC

CHARLES L. SEEGER, Jr., A.B., Professor of Music.
EDWARD G. STRICKLEN, Instructor in Music.
—— ——, Lecturer in Voice Culture.
PAUL STEINDORFF, Choragus.

Students who plan to specialize in music should confer with the head of the department at the beginning of the freshman year, in order to ensure the fulfilment of the prerequisites in the lower division (courses 4A–4B and 5A–5B or their equivalent—theoretical knowledge and practical skill in the handling of elementary diatonic and chromatic harmony and strict counterpoint in five parts). The major courses are: In composition, 104A–104B and 105A–105B; in performance, 109A–109B (in special cases one half of course 101A–101B or 102 may be taken in place of course 109B); in Musicology 111A–111B and 112A–112B. (These courses are given in alternate years.)

Honor-students in the Upper Division.—Students in the honor-group who have completed the major in music with distinction may receive honors in music at graduation by showing ability to do original work either in composition or in a thesis upon a musicological subject. Honor-students will be allowed special privileges in the use of the library and the music building.

Five-hour Courses.—The schedule contemplates the combination of certain two and three-hour courses of complementary character in a five-hour series, with the following plans of enrollment: AB–17, AB–1, 10A–6A, 5A–6A, 101A–109A.

LOWER DIVISION COURSE

FREE ELECTIVE FOR STUDENTS OF ANY YEAR

17. Introduction to the Literature of Music. Professor SEEGER.

Opportunity is offered for hearing many great works. No previous musical knowledge is required.

2 hrs., first half-year; 1 unit. Tu Th, 1.

Composition

Notice to All Students.—Ear-training, practice in sight singing and in dictation will be given as part of the regular work in courses AB, 4A, 4B, and 10A. Students in all courses (course 17 alone excepted) may, without preliminary notice, be examined in regard to their abilities in this respect by the department and required to attend course D until a satisfactory test has been passed.

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LOWER DIVISION COURSES

AB. Symbols and Terminology of Musical Notation and Elementary Harmony and Counterpoint. Mr. STRICKLEN.

Equivalent to matriculation subjects 21*a* and 21*b*.

3 hrs., either half-year; 3 units. First half-year, M W F, 1; second half-year, M W F, 2. Students whose work is of marked excellence may be admitted to course 4B in the following half-year.

D. Ear Training. The STAFF.

1 hr., either half-year. No credit. Sections to be arranged.

4A–4B. Diatonic Harmony and Two-part Strict Counterpoint. (First-year Course.) Mr. STRICKLEN.

Treatment of the complete diatonic resources of the major and minor modes, including the simpler modulations. The contrapuntal studies are undertaken concurrently with the work in harmony.

3 hrs., throughout the year. M W F, 9. Prerequisite: familiarity with the symbols and terminology of musical notation together with a knowledge of intervals and simple metrical types (matriculation subject 21*a*). Students who desire to undertake regular work in harmony, but who find themselves unprepared in this respect, should enroll in course AB and arrange to take course 4B at the beginning of the following half-year.

4B will be given also during the first half-year (M W F, 10), leading to course 5A, beginning January, 1918.

4A will be given also during the second half-year. M W F, 1.

5A–5B. Chromatic Harmony and Three-part and Four-part Strict Counterpoint. (Second-year Course.) Mr. STRICKLEN.

3 hrs., throughout the year. Tu Th S, 9 (or other hour). Prerequisite: course 4A–4B.

5B will be given also during the first half-year. M W F, 2.

5A will be given also during the second half-year. M W F, 10.

FREE ELECTIVE FOR STUDENTS OF ANY YEAR

20A–20B. The Communal Music Drama.
Professor SEEGER aud Assistant Professor CORY.

Primarily for students of marked originality in literary, musical, or dramatic composition.

UPPER DIVISION COURSES

104A–104B. Contrapuntal Studies (Third-year course.)
Mr. STRICKLEN and Professor SEEGER.

Double and triple counterpoint; elementary canon and fugue.

3 hrs., throughout the year. M W F, 11 (or other hour). Prerequisite: course 5A–5B.

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105A–105B. Composition. (Fourth-year course.) Professor SEEGER.
Tu, 10–12, and a weekly conference to be arranged; 2 units. Prerequisite: course 104A–104B.

Performance

NOTE.—Not more than one of the courses in vocal or instrumental practice or repertoire (1, 11A–11B, 2, 101A–101B, 102) may be taken for credit in any one year. Courses 1, 2, and 102 may be repeated.

LOWER DIVISION COURSES

1. Choral Practice. Mr. STEINDORFF.

2 hrs., either half-year; 1 unit. Tu Th, 1. To receive credit, student must have passed or must be enrolled in some other course in the Department of Music (excepting course 17). Any student in the University with a good singing voice may attend the meetings and take part in the final concert or operatic performance.

2. Orchestral Practice. Mr. STEINDORFF.

2 hrs., either half-year; 1 unit. W, 7:30–9:30 p.m.

6A–6B. Musicianship and Musical Performance. Mr. STEINDORFF.

2 hrs., throughout the year. Tu Th, 2. Primarily for students who have studied or are studying the technique of an instrument or of the singing voice.

10A–10B. The Singing Voice.

3 hrs., throughout the year; 2 units each half-year. M W F, 2. (Credit will not be allowed for both Public Speaking 3A–3B and Music 10A–10B.

11A–11B. Repertoire.

2 hrs., throughout the year. M F, 3. Prerequisite: first or second grade in course 10A–10B, or its equivalent—the elements of a sound technique in singing.

UPPER DIVISION COURSES

101A–101B. Concert Repertoire.

1–2 hrs., throughout the year; 1 unit each half-year. Hours to be arranged. Prerequisite: course 11A–11B or exceptional vocal technique.

102. Pianoforte Ensemble Practice. Professor SEEGER.

Eight-hand symphonic arrangements. Open only to students who possess exceptional technique and who practice one hour or more every day.

2–3 hrs., either half-year; 2 units.

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109A–109B. Conducting. Mr. STEINDORFF.

2 hrs., throughout the year; 2 units each half-year. Tu Th, 3, and preceptorial sections 2 hrs. each week to be arranged. Prerequisite: course 5A–5B. Course 6A may, unless previously taken, be required as supplementary study without credit in this course.

Musicology

UPPER DIVISION COURSES

*111A–111B. Critical Study of the History of Music. Professor SEEGER.

Pro-seminar. Lectures, reports.

3 hrs., throughout the year.

112A–112B. Introduction to Musicology. Professor SEEGER.

Pro-seminar. Lectures, reports and a thesis.

Th, 10–12, and weekly conferences to be arranged. Prerequisite: course 5A–5B. Students must have completed course 104A–104B or else be taking it concurrently with this course.

110A–110B. The Teaching of Music. The STAFF.

3 or 4 hrs., throughout the year; 3 units each half-year. Prerequisite: courses 104A–104B, 111A–111B; also course 109A–109B, which, however, may be taken concurrently with this course.

NOTE.—Technical skill as well as mature knowledge of the subject is required of the prospective teacher; the student will therefore be given separate final examinations inquiring into the systematization of musical knowledge and the ability to impart it under the exacting conditions of the modern school, as follows: (1) sight reading and dictation, (2) elements of composition, (3) history of music, (4) pianoforte technique, (5) singing, (6) conducting.

GRADUATE COURSE

200A–200B. Musical Criticism. Professor SEEGER.

Throughout the year. Hours to be arranged.

* Given alternately with course 112A–112B.

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ORIENTAL LANGUAGES

ALFRED FORKE, LL.D., Agassiz Professor of Oriental Languages and Literature.

JOHN FRYER, LL.D., Professor of Oriental Languages, Emeritus.

YOSHI S. KUNO, M.S., Instructor in Japanese.

S. C. KIANG, Assistant in Chinese.

Some of the courses are accepted by the College of Commerce and other colleges as part of their regular curriculum or as equivalents for prescribed work. Students who wish to take up these Oriental studies may therefore find it to their advantage to consult with the Dean of their college as to the arrangements that can be made in that direction.

In addition to the lecture and language courses mentioned below, Professor Forke will offer special assistance to students who wish to take up other branches of study connected with China and Japan. He will also act as advisor to students coming from or going to the Orient.

Students who specialize in Oriental languages are advised to take courses in Sanskrit and in the Semitic languages.

LOWER DIVISION COURSES

Language Courses

3A–3B. Elementary Study of Kuan-hua. Professor FORKE.

Introduction to Kuan-hua, the language spoken, with slight variations, by the officials and about four-fifths of the population of China. Series of progressive, elementary lessons and exercises in reading, speaking and translation.

3 hrs., throughout the year. M W F, 9.

8A–8B. Chinese Conversation for Beginners. Mr. KIANG.

Practical exercises in the use of Kuan-hua.

3 hrs., throughout the year. M W, 11, and a third hour to be arranged.

9A–9B. Elementary Study of the Japanese Language. Mr. KUNO.

Introduction to the Japanese language, with the use of both the Katakana and Hiragana forms of letters. Series of progressive elementary lessons and exercises in reading, writing, and speaking.

3 hrs., throughout the year, beginning in August or in January. First half-year, M W F, 1; second half-year, M W F, 8.

9C–9D. Second Year of Elementary Japanese. Mr. KUNO.

Continuation of 9A–9B, introducing the use of common Chinese characters, with selections from Japanese newspapers and modern Japanese authors.

3 hrs., throughout the year, beginning in August or in January. First half-year, M W F, 8; second half-year, M W F, 10.

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10A–10B. Chinese Character Writing with Brush and Ink, an Introduction to the Chinese Language. Mr. KIANG.

2 hrs., throughout the year, beginning in August or in January; 1 unit each half-year. M, 1–3.

12A–12B. Japanese Character Writing. Mr. KUNO.

Instruction in handling the brush, in making the various strokes, in forming the characters, and in different styles of writing.

2 hrs., throughout the year, beginning in August or in January; 1 unit each half-year. S, 8–10.

UPPER DIVISION COURSES

Language Courses

103A–103B. Elementary Study of the Chinese Written Language, Ancient and Modern. Professor FORKE.

3 hrs., throughout the year. M W F, 11.

104A–105B. Advanced Study of Kuan-hua. Mr. KIANG.

Series of progressive advanced lessons and exercises in reading, speaking, and translation.

3 hrs., throughout the year. M W F, 10.

105A–105B. Elementary Study of the Classics and the Written Language of Japan. Mr. KUNO.

Progressive selections from various kinds of current literature and from standard Japanese classics and poetical works.

2 hrs., throughout the year. Tu Th, 8. Prerequisite: course 110A–110B.

106A–106B. Advanced Study of Japanese Classics. Mr. KUNO.

Interpretation of Hōjō-ki, Tsure-zuregusa, and Makura-no-sōshi. May be repeated without duplication of credit.

2 hrs., throughout the year, to be arranged. Prerequisite: course 105A–105B.

107A–107B. Popular Reading Course in Japanese. Mr. KUNO.

Designed primarily for California-born Japanese and students of other nationalities who desire to attain facility in reading modern literature, magazines, and newspapers.

1 hr., throughout the year; 1 unit each half-year. F, 2.

108A–108B. Advanced Chinese Conversation. Mr. KIANG.

3 hrs., throughout the year. M W F, 3. Prerequisite: course 8A–8B, or some practice in conversation.

110A–110B. Advanced Study of the Japanese Spoken Language. Mr. KUNO.

Series of progressive advanced lessons in reading, speaking, writing, translation and composition.

3 hrs., throughout the year. M W F, 9. Prerequisite: course 9C–9D.

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112A–112B. Study of the Chinese Classical Language.
Professor FORKE.

(*a*) Reading of Mencius. (*b*) Interpretation of the works of Lieh-tse. May be repeated without duplication of credit.

2 hrs., throughout the year. Tu Th, 10.

113A–113B. Reading of a Chinese Text. Mr. KIANG.

2 hrs., throughout the year. W F, 2.

130A–130B. Chinese Composition. Mr. KIANG.

Writing of letters and short essays.

2 hrs., throughout the year. M F, 1. Prerequisite: some knowledge of the modern written language.

Lecture Courses

109A–109B. Japan and Her Makers. Mr. KUNO.

Prominent historical characters and events will be treated in chronological order, so as to give a general view of the history of Japan. Stress will be placed upon her political and social evolution and the development of her civilization. About 700 pages of outside reading are required in this course.

2 hrs., throughout the year. Two sections: I, Tu Th, 9; II, M W, 11. Prerequisite: junior standing or History 1A–1B or Political Science 106.

*121A–121B. Commerce and Industry of Japan. Mr. KUNO.

The development of commerce and industry in Japan; economic conditions and foreign trade.

1 hr., throughout the year. W, 2. Prerequisite: course 109A–109B.

*122A–122B. Japanese Religions and Ethics. Mr. KUNO.

The development of Shintoism, Confucianism, Buddhism, Christianity, and the modern Ethical System in Japan and their effect on her civilization.

1 hr., throughout the year. W, 2. Prerequisite: course 109A–109B.

123A–123B. Japanese Art and Literature. Mr. KUNO.

1 hr., throughout the year. W, 2.

*124A–124B. International Relations of Oriental Countries. Mr. KUNO.

The political and intellectual relations of Japan, China, and Korea, and their diplomatic relations with Occidental powers.

1 hr., throughout the year. W, 2. From 400 to 500 pages of outside reading and a term paper of about 3500 words are required.

NOTE.—Courses 121, 122, 123, and 124 will form a series to be given in successive years.

* Not to be given, 1917–18.

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126A–126B. Chinese Culture: Religion, Art, and Literature. Professor FORKE.

2 hrs., throughout the year. M W, 10.

127. Chinese Industrial Art. Professor FORKE.

Continuation of 126A–126B.

1 hr., first half-year. Tu, 9.

*128A–128B. The Economic Conditions of China. Professor FORKE.

Chinese agriculture, industries, trade and commerce, and means of transportation.

1 hr., throughout the year. F, 10.

129A–129B. History of China. Professor FORKE.

1 hr., throughout the year. F, 10.

GRADUATE COURSES

201A–201B. Oriental Seminar. Professor FORKE.

Reviews of new books on China, research work, and reports by the students on assigned subjects.

2 hrs., throughout the year, to be arranged.

203A–203B. Research Work and a Critical Study of Modern Topics and Books on Japan. Mr. KUNO.

Class work will consist of lectures by the instructor and reports by students. May be repeated without duplication of credit.

2 hrs., throughout the year. F, 3–5. Prerequisite: at least senior standing, and the completion of 6 units in upper division courses in the department.

* Not to be given, 1917–18.

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PALAEONTOLOGY

JOHN C. MERRIAM, Ph.D., Professor of Palaeontology and Historical Geology.

BRUCE L. CLARK, Ph.D., Instructor in Palaeontology.

EUSTACE L. FURLONG, Assistant in Palaeontology.

The field for palaeontologic study and research on the Pacific Coast, and especially in the territory immediately accessible from the University, is a most remarkable one. A large part of the geologic column is exposed and open for study in the region easily reached from the University. Within a radius of twenty-five miles from Berkeley the Coast Range formations, ranging from early Cretaceous to Pleistocene, are represented by splendid exposures containing abundant fossil remains. This section is the basis for regular field work.

Research work in palaeontology has been based largely on a study of the material immediately at hand. Our knowledge of West Coast palaeontology is now in the making, and advanced students are expected to assist in working out some of the problems before us. The collections available for study and comparison in research include a representative series of the invertebrate faunas of California, together with a large quantity of invertebrate material from horizons the position of which are not as yet clearly determined. The vertebrate collections include the original material obtained by the University in progress of work in the John Day region of Oregon; the Virgin Valley, Thousand Creek and Cedar Mountain regions of Nevada; Potter Creek Cave, Samuel Cave, and Hawver Cave of the mountain regions of California; Rancho La Brea, and the Mohave region of Southern California; and the Triassic limestones of Northern California and Western Nevada.

There are no laboratory fees in this department.

LOWER DIVISION COURSES

1. General Palaeontology. Professor MERRIAM.

Lectures, assigned reading, and written reports. General principles of the study of the history of life.

2 hrs., first half-year. Tu Th, 10. Preparatory to Geology 1B. Zoology 1A is recommended as preliminary.

2. Demonstration Course. Professor MERRIAM.

Demonstrations, excursions, conferences, and assigned reading.

1 hr., first half-year. Two sections: I, Tu, 1; II, Th, 11. Course to accompany course 1.

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UPPER DIVISION COURSES

102. Invertebrate Palaeontology. Dr. CLARK.

A laboratory study with assigned reading on the most important forms of fossil invertebrates, with special reference to the history of life in the Pacific Coast region.

6 hrs. laboratory, 2 hrs. lecture, first half-year; 4 units. Prerequisite: course 1 completed or in progress.

103. Invertebrate Faunas of the Pacific Coast Region. Dr. CLARK.

Laboratory and field work on the fossil invertebrate faunas of the Pacific Coast region.

6 hrs. laboratory, 1 hr. lecture, 3 hrs. field work, second half-year; 4 units. Prerequisite: course 102.

104. Vertebrate Palaeontology. Professor MERRIAM.

Osteology, affinities, and history of the principal groups of vertebrates.

3 hrs. laboratory, 1 hr. lecture or pro-seminar, first half-year; 2 units. Prerequisite: course 1 completed or in progress, or Zoolgy 1A. The lectures may be taken separately as Palaeontology 104A (1 unit) by students in Zoology 106.

105. History of Vertebrate Life in Western North America. Professor MERRIAM.

A study of the extinct vertebrate faunas of western North America, with special reference to the most important problems illustrated by the history of these groups.

3 hrs. laboratory, 1 hr. lecture, 1 hr. pro-seminar, second half-year; 3 units. Prerequisite: course 104.

PRIMARILY FOR GRADUATES

206A–206B. Palaeontologic Seminar. Professor MERRIAM.
1 hr., throughout the year; 1 unit each half-year.

Sec. 1. Invertebrate palaeontology of the Pacific Coast region.

Sec. 2. Vertebrate palaeontology of the Pacific Coast region.

207. Advanced Vertebrate Palaeontology. Professor MERRIAM.

Credit not to exceed 6 units. Laboratory or field work, which may be done either during a session or during vacation periods. The work must be registered for in advance, it must be planned with the instructor in charge, and must be carried on under the direction of the instructor. Work done outside the limits of the fall or spring sessions must be supplemented by a written report.

208. Advanced Invertebrate Palaeontology. Professor MERRIAM and Dr. CLARK.

Credit values, requirements as to place and time for conducting work, and nature of conditions governing final reports arranged on the same basis as for course 207.

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PATHOLOGY AND BACTERIOLOGY

FREDERICK P. GAY, A.B., M.D., Professor of Pathology.
GLANVILLE Y. RUSK, A.B., M.D., Associate Professor of Pathology.
IVAN C. HALL, A.B., M.S., Assistant Professor of Bacteriology.
JEAN V. COOKE, A.B., M.D., Assistant Professor of Pathology.
—— ——, Instructor in Bacteriology.
—— ——, Assistant in Pathology.
DOLORES E. BRADLEY, B.S., M.A., Assistant in Bacteriology.
RUTH L. STONE, M.S., Edith Claypole Research Fellow in Pathology.
CARL L. A. SCHMIDT, M.S., Ph.D., Research Assistant in Pathology.
Student Assistants.

All courses are given in the Hearst Laboratory of Pathology in Berkeley, except as otherwise noted.

LOWER DIVISION COURSE

1. General Bacteriology and Microbiology.
Assistant Professor HALL, —— ——, Miss BRADLEY, and Assistants.

History of bacteriology; morphology, classification, ecology and metabolism of micro-organisms; sterilization; preparation of culture media; microscopic examination, cultivation and identification of bacteria; introduction to microbiology of air, water, soil, foods (including milk), industrial processes, and certain human, animal and plant diseases.

9 hrs., second half-year; 4 units. Lectures, Tu Th S, 9; laboratory sections: I, M W F, 1–3; II, M W F, 3–5; III, Tu Th S, 10–12. Prerequisite: Chemistry 1A. Fee, $10. Deposit, $5, subject to refund, less deduction for breakage at end of half-year.

UPPER DIVISION COURSES

PRIMARILY FOR MEDICAL STUDENTS

The second year medical course in pathology aims to outline the natural history of disease in four correlated courses dealing respectively with causation, progress and effect.

101. Medical Bacteriology and Protozoology.
Assistant Professor HALL and Miss BRADLEY.

History of bacteriology; morphology, classification, ecology and metabolism of micro-organisms; sterilization; preparation of culture media; microscopic examination, cultivation, and identification of bacteria; systematic study of pathogenic micro-organisms.

12 hrs., first half-year; 4 units. Lecture, M Tu Th F, 1; laboratory, 2–4. Open with the consent of the instructor to non-medical students whose record in course 1 is thoroughly satisfactory. Fee and deposit for non-medical students, same as for course 1.

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102. Infection and Immunity: Lectures. Professor GAY.

Accessible aspects of functional pathology; evolution of infectious diseases of the body and the mechanism of animal defense; principles of immunology and their applicability in prophylaxis, diagnosis and specific therapy.

2 hrs., first half-year. M W, 11. Prerequisite for non-medical students: course 1.

103. Infection and Immunity: Laboratory. Professor GAY and —— ——.

Experimental methods; demonstrations.

4 hrs., first half-year; 1 unit. M Tu Th F, 4. Prerequisite for non-medical students: course 1. Fee for non-medical students, $10. This course cannot be taken separately from courses 101, 102.

104. Morbid Anatomy and Histopathology.
Associate Professor RUSK and Dr. ——.

Changes in organs and tissues in disease in the animal and human body; macroscopic lesions illustrated by fresh material from autopsies and museum specimens. Lectures, conferences, and practice.

16 hrs., first half-year; 6 units. M W Th S, forenoons.

105. Autopsy Course. Assistant Professor COOKE.

Third and fourth years in the medical curriculum at the University of California Hospital and at the San Francisco Hospital.

GRADUATE COURSES

201. Research. Professor GAY.

Problems of infection and immunity.

Either half-year. Hours to be arranged.

202. Research. Neuropathology. Associate Professor RUSK.

Either half-year. Hours to be arranged.

203. Research. Bacteriology and Protozoology.
Assistant Professor HALL.

Investigation of concrete problems suggested by the work in general or medical bacteriology.

Either half-year. Hours to be arranged. Prerequisite: course 1 or its equivalent.

204. Advanced Morbid Anatomy and Histopathology.
Assistant Professor COOKE.

Autopsy technic and the working up of tissues and cultures resulting from post-mortem examination. Elective for fourth-year and graduate students in medicine.

Second half-year. University Hospital.

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205. Experimental Pathology.

Associate Professor RUSK and Dr. ——.

Experiments illustrating functional changes as evidenced by chemical and physiological methods and tissue alterations; results demonstrated in course 104. Special problems. Open to qualified students and graduates by special arrangement.

206. Immunochemistry. Seminar. Dr. SCHMIDT.

Consideration and discussion of the physical-chemical aspects of the subject of immunity. Informal discussion and presentation of current problems.

First half-year; 1 unit. Time to be arranged.

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PHILOSOPHY

GEORGE M. STRATTON, Ph.D., Professor of Psychology.

CHARLES H. RIEBER, Ph.D., Professor of Logic.

GEORGE P. ADAMS, Ph.D., Associate Professor of Philosophy.

ARTHUR U. POPE, M.A., Assistant Professor of Philosophy.

WARNER BROWN, Ph.D., Assistant Professor of Psychology.

CLARENCE I. LEWIS, Ph.D., Assistant Professor of Philosophy.

JACOB LOEWENBERG, Ph.D., Instructor in Logic.

OLGA L. BRIDGMAN, M.D., Ph.D., Instructor in Mental Abnormalities of Childhood.

SPENCER W. SYMONS, A.B., LL.B., Assistant in Psychology.

Honor-students in the Upper Division.—Candidates will enroll in the honor-course 199. The student's work in this honor-course will be under the supervision of one or more instructors with whom the student is taking a major course. The honor-course will hold stated fortnightly meetings at which time students will report on their work within their chosen field.

LOWER DIVISION COURSES

Although these courses properly fall within the first two years of undergraduate work, and are prerequisite, as specified below, to the major courses in the upper division, they are all open as free electives to any student in the University, unless restrictions are explicitly stated.

Students who intend to do advanced work in philosophy should take either course 103, History of Philosophy, or 104, Ethics, in the sophomore year. Both these courses are regularly open to sophomores who intend to take further work in philosophy.

Philosophy

1A. Deductive Logic. Professor RIEBER.

Division; definition; the forms and transformations of judgments; the syllogism, and the deductive fallacies.

3 hrs., either half-year. M W F, 1.

1B. Inductive Logic. Professor RIEBER.

The presuppositions and methods of the inductive sciences.

3 hrs., either half-year. M W F, 2. Prerequisite: course 1A.

1C. Elements of the Logic of Science. Assistant Professor LEWIS.

Graphic and symbolic methods in logic; typical logical problems common to all branches of scientific procedure.

3 hrs., either half-year. M W F, 1. Prerequisite: course 1A.

The logic-mathematics requirement for the junior certificate may be satisfied by completing courses 1A and 1B or courses 1A and 1C. But courses 1B and 1C cannot both be counted for credit either toward junior certificate requirements or the bachelor's degree.

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Psychology

2A. General Psychology. Professor STRATTON.

The facts of consciousness, their relation to one another and to their physical correlates. Demonstrations, lectures, and readings.

3 hrs., first half-year. M W F, 3. The course is not open to freshmen; sophomores on completing this course may elect course 2B.

UPPER DIVISION COURSES

FREE ELECTIVE COURSES

Normally, free elective courses in the upper division are restricted to students holding the junior certificate. But other students whose records give evidence of proper qualification may be admitted, provided they have been in residence not less than a year. Such students must make application in person to the instructor in charge of the course sought, prior to its opening.

Psychology

*10. Memory and the Process of Learning. Assistant Professor BROWN.

The acquisition of habits and of skill, the formation of associations; economical methods of learning and studying; the training of memory. Lectures and assigned reading.

3 hrs., first half-year. M W F, 1.

Philosophy

36A–36B. Aesthetics. Assistant Professor POPE.

First half-year: The fundamental principles of the fine arts. Analyses of illustrative material.

Second half-year: Nature, origin, and development of aesthetic experiences. Physiological and psychological basis; logical and ethical relations, and philosophical significance.

2 hrs., throughout the year. Tu Th, 11.

40. The Problems of Philosophy. Assistant Professor POPE.

The aim and scope of philosophy; relations to science and religion. Discussion of characteristic problems. Outlines of typical solutions.

3 hrs., second half-year. Lectures, M W, 11; recitations and conferences in sections, 1 hr., to be arranged.

*45A–45B. Philosophies of Social Relations. Assistant Professor LEWIS.

A critical survey of the philosophical basis of anarchism, individualism and socialism. Fundamental ethical problems of political and economic organization. For students who have some knowledge of economic and social theory.

2 hrs., throughout the year. Tu Th, 2.

46. Literary Expressions of Philosophic Problems. Dr. LOEWENBERG.

Analysis of fundamental philosophic problems through an interpretation of selected literary masters, such as Dante, Goethe, Schiller, Dostoyevsky, Tolstoy, and others.

2 hrs., first half-year. Tu Th, 3.

* Not to be given, 1917–18.

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MAJOR COURSES

Philosophy

103A–103B. History of Philosophy. Assistant Professor LEWIS.

Critical account in outline, of the course of Occidental thought, with references to the thought of the Orient.

3 hrs., throughout the year. M W F, 2.

104A–104B. Ethics, Theoretical and Practical. Associate Professor ADAMS.

History and criticism of the chief ethical theories, with an application of the results to the main problems of conduct, individual and social.

3 hrs., throughout the year. M W F, 1.

105A. The Kantian Philosophy. Assistant Professor LEWIS.

3 hrs., first half-year. Tu Th, 2, and a third hour to be arranged. Prerequisite: course 103A–103B.

109. Symbolic Logic. Assistant Professor LEWIS.

Graphic methods in logic, the elements of symbolic logic, and some applications.

3 hrs., second half-year. M W, 11, and a third hour to be arranged. Prerequisite: course 1A.

111. Metaphysics. Associate Professor ADAMS.

The relation between mind and body, the nature of consciousness and personality, the philosophy of evolution, and man's relation to nature.

3 hrs., first half-year. M W F, 3. Prerequisite: course 103B.

112A–112B. Religion. Associate Professor ADAMS.

First half-year: The origin and development of religion, the chief types of ideas and practices in the historical religions.

Second half-year: Analysis and criticism of contemporary interpretations of religion, the truth of religious ideas, and the place of religion in modern life.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: course 1A or 1B.

114. Theory of Knowledge. Professor RIEBER.

An intensive study of the morphology of the concepts, the import of propositions, and the principles of inference.

2 hrs., first half-year. Tu Th, 9. Prerequisite: courses 1A, 1B.

115. Logic of Science. Professor RIEBER.

The relation of the other sciences to mathematics and logic; the use of hypothesis in science; modern methods of verification and modern ideas about scientific truth.

2 hrs., second half-year. Tu Th, 9. Prerequisite: courses 1A, 1B.

* Not to be given, 1917–18.

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116A–116B. Plato. Assistant Professor POPE.

3 hrs., throughout the year. M W F, 9. Prerequisite: course 103A–103B. This course may be counted as a major in Greek for students who read the Plato and the Aristotle in the original.

123. German Idealism after Kant. Dr. LOEWENBERG.

Fichte, Schelling and Hegel: the development of the Kantian philosophy in Germany.

3 hrs., second half-year. M W F, 1. Prerequisite: courses 103A–103B and 105A.

125. Philosophic Theories of the Nineteenth Century. Dr. LOEWENBERG.

Summary account of Fichte, Schelling, Hegel, Schopenhauer, Darwin, Comte, Mill, Spencer, Haeckel, Nietzsche.

3 hrs., first half-year. M W F, 1. Prerequisite: course 103B.

135. Contemporary Tendencies in Philosophy. Dr. LOEWENBERG.

A critical discussion of contemporary realism, idealism, pragmatism, and the philosophy of Bergson.

3 hrs., second half-year. M W F, 2. Prerequisite: course 103B.

*136. Advanced Aesthetics. Assistant Professor POPE.

The major problems of aesthetics in the light of recent contributions. Critical discussion of the work of Bosanquet, Croce, Lipps, Meumann, Puffer, with special reference to the problem of method. Applications of aesthetic principles to recent tendencies in art.

3 hrs., first half-year, to be arranged. Prerequisite: course 36A–36B.

137. Recent English Idealism. Assistant Professor POPE.

The work of Green, Caird, Bosanquet, with special reference to the philosophical theory of the state.

3 hrs., first half-year. M, 3; W, 3–5. Prerequisite: course 103A–103B.

*138. Continental Rationalism in the Seventeenth Century. Dr. LOEWENBERG.

Descartes, Spinoza, and Leibnitz, with some attention to their contemporaries.

3 hrs., first half-year. M W F, 1. Prerequisite: course 103A–103B.

139. The Philosophy of Royce. Dr. LOEWENBERG.

2 hrs., throughout the year. Tu Th, 1. Prerequisite: course 103A–103B or course 104A–104B.

Psychology

102B. Applied Psychology. Professor STRATTON.

Certain results of modern psychology bearing upon the work of the lawyer, the physician, the teacher, and the minister.

3 hrs., second half-year. M W F, 3. Open to sophomores who have completed course 2A, which is also the prerequisite for upper division students who wish to take this course.

* Not to be given, 1917–18.

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145. Social Psychology. Associate Professor ADAMS.

The basis of social relations and the social aspects of human nature. The application of social psychology to ethical, political, and religious problems.

3 hrs., second half-year. M W F, 3. Prerequisite: course 2A or 2B.

106. Introduction to Psychological Experiment. Assistant Professor BROWN.

Sensation, perception, emotion, movement, attention, memory, imagination, habit.

4 hrs., first half-year; 2 units. Tu Th, 1–3. Prerequisite: course 2A.

107. Phases of Medical Psychology. Assistant Professor BROWN.

Experiments illustrating methods of testing and measuring mental processes, particularly the methods employed in applied and clinical psychology.

4 hrs., second half-year; 2 units. Tu Th, 1–3. Prerequisite: course 2A.

124A–124B. History of Psychology. Professor STRATTON.

Psychological observations, theory, and method, through early Hindu and Greek thought to the present time.

2 hrs., throughout the year. Tu Th, 3. Prerequisite: course 2A.

133. Advanced General Psychology. Assistant Professor BROWN.

Contemporary discussions of sensation, perception, attention, the self, the will, and related topics. Lectures, recitations, and reports.

3 hrs., second half-year. M W F, 9. Prerequisite: course 2A.

140A–140B. Psychological Experiments. Assistant Professor BROWN.

Special yet connected problems; experiments, reading, and discussions in common.

Not less than 6 hrs., throughout the year; 3 units. Units and hours to be arranged with each student, at times within M Tu W Th F, 10–12 and 1–4. Prerequisite: course 106 or 107.

*141A–141B. Psychological Conference. Professor STRATTON.

Reading, with discussion, of selected topics in psychology.

2 hrs., throughout the year. Tu Th, 3. Prerequisite: course 2A.

142. Abnormal Psychology of Childhood: Elementary. Dr. BRIDGMAN.

A study through lectures, reading, and clinical demonstration, of the more important phases of mental abnormality in children.

2 hrs., throughout the year. M W, 4. Prerequisite: courses 2A and 2B.

143. Abnormal Psychology of Childhood: Advanced. Dr. BRIDGMAN.

Special problems, with field work.

2 hrs., throughout the year. M W, 3. Prerequisite: courses 106 or 107, and 142.

199A–199B. Honor-course. The STAFF.

Throughout the year. Hours to be arranged.

* Not to be given, 1917–18.

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GRADUATE COURSES

The qualifications for each course are indicated in its prerequisite. Qualified undergraduates may be admitted by special permission of the officers in charge.

211A–211B. Seminar in Logic. Professor RIEBER.

Logic as the method of truth; development and criticism of the leading theories of knowledge.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: a good knowledge of Kant's critical writings, and of the attempted continuation of his principles by Fichte and Hegel.

212A–212B. Ethics Seminar. Associate Professor ADAMS.

Topic for 1917–18: The analysis of some fundamental concepts of theoretical ethics, and their practical application.

2 hrs., throughout the year, to be arranged. Prerequisite: courses 103 and 104.

213A–213B. Psychological Research.
Professor STRATTON and Assistant Professor BROWN.

The investigation of special problems selected with regard to the individual interest of those electing the work; reports and discussions. Prerequisite: course 133 or 140. Units and hours arranged with each student; all are expected to attend a special fortnightly meeting, 2 hrs., throughout the year, Th, 8–10 p.m.

215. The Theory of Consciousness: Seminar. Assistant Professor LEWIS.

2 hrs., second half-year, to be arranged.

221A–221B. Seminar in the History of Aesthetic Theory.
Assistant Professor POPE.

Criticism of the classical aesthetic theories, particularly those of Plato, Aristotle, Kant, Schopenhauer, Hegel, and Lessing.

2 hrs., throughout the year, to be arranged.

225A–225B. Seminar in Hegel's Philosophy. Dr. LOEWENBERG.

2 hrs., throughout the year. Tu, 7:30–9:30 p.m.

In addition to the foregoing courses, special lines of study will be arranged for qualified graduates who are candidates for higher degrees, or who wish to carry on advanced work.

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PHYSICAL EDUCATION FOR MEN

WALTER E. MAGEE, Professor of Physical Culture.

FRANK L. KLEEBERGER, B.S., M.A., Director of Men's Gymnasium and Associate Professor of Physical Education.

FREDERICK W. COZENS, A.B., Instructor in Physical Education.

JAY B. NASH, A.B., Lecturer in Recreation.

MARCUS FREED, Special Assistant in Boxing.

CHARLES W. ANDREWS, Special Assistant in Wrestling.

The prerequisites to advanced work in physical education are Chemistry 1A, Zoology 1A, and Hygiene 3.

Plan of Prescribed Work.—All students are examined from time to time, with reference to their health and physical development, and appropriate exercises are prescribed. Intrants are classified for their prescribed work on the basis of physical efficiency, embracing tests of health, strength, endurance, agility, ability to swim and skill in self-defense. Men qualified for the athletic division may take regular work in any type of sport from golf to football. Men failing so to qualify, but not found defective in any essentials of health or bodily conformation, will meet for gymnastic drill during the three weeks, and will be gradually assigned, after medical examination and consultation with the director, to work adapted to their specific needs. The aim is to promote such men as quickly as possible into the athletic division. Men showing abnormality of bodily conformation or physical defects of any sort will be classed as "special" and will be given individual work and advice based on the data of medical and anthropometric examination. The requirements in swimming and self-defense which qualify for athletic division standing must be satisfied by all male students before receiving final credit for the two required units of physical education. Exceptions are made only on advice of the University Infirmary. At the end of each college year tests will be held for those who wish to qualify for the honor-division. Details of the physical efficiency test will be found in the official athletic guide of the department.

Under the above regulations any of the courses listed as lower division work may be taken in satisfaction of the University requirements of two units in physical education. The letters A and B denote the work as taken for credit during the two terms respectively, of the freshman year, while the letters C and D represent the work done in the same courses when taken for sophomore credit. Two hours' work each week throughout the freshman and sophomore years satisfy the above requirement; one-half unit of credit is given for each half-year's work done on the above schedule.

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LOWER DIVISION COURSES

1A–1B. Gymnastics. Associate Professor KLEEBERGER.

Dancing, boxing, apparatus and tumbling drills; in the open air when conditions permit.

2 hrs., either half-year; ½ unit. Four sections: M Tu Th F, 3–5.

2A–2B. Special. Associate Professor KLEEBERGER.

Corrective gymnastics: careful attention is given to those with postural defects and abnormal conditions, such as flat-foot, obesity, etc.

2 hrs., either half-year; ½ unit. Two sections: M Tu Th F, 2.

3A–3B. Track. —— ——.

Class instruction, individual coaching, and advice, supplemented by cross-country runnings, games of hare and hound, etc.

2 hrs., either half-year; ½ unit. Four sections: M Tu Th F, 3–5.

4A–4B. Rugby Football, Soccer, and Baseball. Mr. COZENS.

Games played in season under careful direction of coach and assistants.

2 hrs., either half-year; ½ unit. Six sections: M Tu Th F, 3–6.

5A–5B. Basket Ball. —— ——.

Practice games throughout the year, with games scheduled against visiting teams at hours outside the regular section meetings. Sections limited to twenty men each.

2 hrs., either half-year; ½ unit. Six sections: M Tu Th F, 3–6.

6A–6B. General Recreation. Mr. COZENS.

Handball, tennis, playground baseball, volley-ball, basket ball, field hockey, golf, and cross-country walking.

2 hrs., either half-year; ½ unit. Six sections: M Tu Th F, 3–5.

7A–7B. Elementary Boxing. Mr. FREED.

First principles of position, footwork, and blows.

2 hrs., either half-year; ½ unit. Ten sections, limited to thirty men in each: M Tu Th F, 10–12, 2–5.

8A–8B. Elementary Wrestling. Mr. ANDREWS.

Preparatory exercises for special development, various holds, their counters, and general theory of weight control.

2 hrs., either half-year; ½ unit. Ten sections: M Tu Th F, 10–12, 2–5.

9A–9B. Elementary Fencing. —— ——.

Class exercise in single stick, broad sword, foil and bayonet, followed by practice in personal combat. Men must supply their own swords, plastrons and gloves.

2 hrs., either half-year; ½ unit. Six sections, limited to thirty men in each: M Tu Th F, 3–6.

10A–10B. Swimming. —— ——.

Personal instruction in various strokes as well as class drills in special exercises arranged to facilitate and strengthen necessary co-ordinations. Demonstrations and practice in methods of rescue and resuscitation. Instruction in the principles of diving.

2 hrs., either half-year; ½ unit. Six sections: M Tu Th F, 2–5.

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UPPER DIVISION COURSES

100A. Physiology of Exercise. Associate Professor KLEEBERGER.

Physiology of muscular tissue. Theories of contraction, fatigue, and neuro-muscular control. Influence of exercise on respiration, circulation, and nutrition. Values and dangers in athletic training.

1 hr., second half-year. Tu, 1. Prerequisite: Physiology 1 or 107.

106A. Athletic Supervision. Mr. COZENS.

Technique of organization in all types of institutions and tournaments, athletic meets, leagues, and series; coöperation with school systems and their adaptation in stimulating the interest of large numbers in recreational sport. Intra-mural sports, class athletics, and school athletics. Educational analysis and ideals; significance in moral education.

2 hrs., first half-year; 1 unit. Tu, 1–3.

107A. Organization and Management of Playgrounds. Mr. NASH.

The development and meaning of the playground and recreational movement; recreational surveys; adaptation to community needs; coöperation with existing organizations; qualifictaions and duties of directors; playground construction.

1 hr., first half-year; Th, 1.

107B. Practical Conduct of Playground Activities. Mr. NASH.

Details of organization and direction with reference to educational, moral, athletic, dramatic and social phases; technique of group, team and individual games; organization and conduct of leagues, meets, and daily routine work. Demonstration and actual conduct of games and leagues will be carried on at the Play Center.

1 hr., second half-year, Th, 1.

110A–110B. The Practice of Teaching.
Associate Professor KLEEBERGER and STAFF.

Students may work under supervision as assistants in the playground, campfire and scouting activities of Oakland and Berkeley. Men may serve also in the athletic and gymnastic activities of the men's department at the University. Conferences will be held with the instructors in charge of the assigned activities, and reports of the work done will be submitted at the end of each half-year.

Hours to be arranged.

111A–111B. Advanced Gymnastics. Associate Professor KLEEBERGER.

Heavy apparatus, rings and mats.

4 hrs., throughout the year; 1 unit each half-year. M Tu Th F, 5. Prerequisite: course 1A–1B or the consent of the instructor.

112A–112B. Advanced Boxing, Wrestling, or Fencing.
Mr. ANDREWS and Mr. FREED.

Three divisions, one for each of the above activities.

4 hrs., throughout the year; 1 unit each half-year. M Tu Th F, 5. Prerequisite: courses 7AB, 8AB, 9AB, or the consent of the instructor.

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PHYSICAL EDUCATION FOR WOMEN

[2]MAUDE CLEVELAND, M.A., Assistant Professor of Physical Education; Director of the Women's Gymnasium.

RUTH ELLIOTT, A.B., Instructor in Physical Education.

SIGNE E. HAGELTHORN, Instructor in Physical Education.

EDNA L. ROOF, B.L., Instructor in Physical Education.

FLORENCE EISENHARDT, Instructor in Physical Education.

MARY WOODFORD, A.B., Instructor in Physical Education.

MILDRED LEMON, Assistant in Physical Education.

FRANCES WHITTLESEY, Assistant in Physical Education.

GERTRUDE L. GIBSON, Assistant in Physical Education.

WALTER I. BALDWIN, M.D., Special Lecturer in Orthopedics.

LOWER DIVISION COURSES

Prescribed Courses.—The requirement for the junior certificate includes two hours of work during the freshman year, two hours of work during the sophomore year, and, for students whose physical condition is average or above, proficiency in swimming. A physical examination is given to all intrants at the time of the medical examination in August, and freshmen are assigned according to general physical condition to course 52A–52B, 53A–53B, or 54A–54B. Students entering in January will, if their physical condition permits, be assigned to Sections X and XI of course 52A–52B. Completion of any of these courses with its sophomore continuation will satisfy the requirement for the junior certificate. However, courses 52A–52B, 52C–52D, are prerequisite to all upper division work in the department.

UPPER DIVISION COURSES

Honor-students in the Upper Division.—Students who undertake honor-work in physical education must have a fair degree of motor control, a sense of rhythm, and must be without organic disease or functional disorder. The following courses are prerequisite to honor-work in physical education: Anatomy 102, Hygiene 3 or 107, Physiology 1 or 107.

The normal requirement for honor-students includes the following courses: Physical Education for men 100A; Physical Education for Women 151, 152, 165A, 165B, 175, 160A–160B, or 161A–161B.

All theoretical courses in the department of physical education for women are open to men; all theoretical courses in the department of physical education for men are open as elective courses to women.

To maintain candidacy students must fulfill the requirement for a major in an allied science subject as well as in physical education, and must carry out in a satisfactory manner a programme approved by the department.

[2] In residence second half-year only, 1917–18.

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Honors at graduation will be awarded upon the quality of special work undertaken by the student and upon the quality of practical and theoretical work in the department.

Honor-students will be given special opportunity for research in this department in connection with allied departments such as anatomy, education, hygiene, physiology, psychology, and zoology. In addition they will be allowed opportunities for specialization in educational gymnastics in connection with public school teaching, in corrective gymnastics at the orthopedic clinic of the University of California Medical School, and in athletic supervision in connection with department instruction.

LOWER DIVISION COURSES

52A–52B. Prescribed Course for Freshmen.
Miss ROOF, Miss WOODFORD, Miss LEMON.

Required of all undergraduate women not enrolled in courses 53A–53B or 54A–54B during the first year of their attendance at the University.

2 hrs., throughout the year; ½ unit each half-year. Ten sections: I, Tu Th, 11; II, Tu Th, 10; III, Tu Th, 10; IV, Tu Th, 9; V, Tu Th, 3; VI, Tu Th, 3; VII, W F, 10; VIII, Tu Th, 11; IX, W F, 2; X (primarily for students entering in January), M W, 9; XI (primarily for students entering in January), Tu Th, 4.

52C–52D. Prescribed Course for Sophomores.
Miss EISENHARDT, Miss ROOF, Miss LEMON, and Miss WHITTLESEY.

Required of all undergraduate women not enrolled in courses 53C–53D or 54C–54D during the second year of their attendance at the University.

2 hrs., throughout the year; ½ unit each half-year. Eight sections: I, M W, 11; II, M F, 10; III, M W, 3; IV, Tu Th, 9; V, M W, 2; VI, M F, 9; VII, W F, 9; VIII, W F, 10. 52D–X, W F, 9. Prerequisite: course 52A–52B.

53A–53B. Corrective Gymnastics. Miss HAGELTHORN and Miss WOODFORD.

Required instead of course 52A–52B of first-year students whose medical and physical examinations indicate the need of corrective exercises.

2 hrs., throughout the year; ½ unit each half-year. Six sections: I, M W, 9; II, M W, 10; III, Tu Th, 9; IV, Tu Th, 10; V, M W, 2; VI, M W, 3.

53C–53D. Corrective Gymnastics.
Miss HAGELTHORN and Miss WHITTLESEY.

Required instead of course 52C–52D of second-year students whose medical and physical examinations indicate the need of corrective exercises.

2 hrs., throughout the year; ½ unit each half-year. I, M W, 11; II, Tu Th, 11. Prerequisite: course 53A–53B.

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54A–54B. Restricted Exercise. Miss WHITTLESEY.

Required instead of course 52A–52B of first-year students whose medical and physical examinations indicate the need of restricted work.

2 hrs., throughout the year; ½ unit each half-year. Tu Th, 2.

54C–54D. Restricted Exercise. Miss LEMON.

Required instead of course 52C–52D of second-year students whose medical and physical examinations indicate the need of restricted work.

2 hrs., throughout the year; ½ unit each half-year. Tu Th, 10. Prerequisite: course 54A–54B.

ELECTIVE COURSES

55A–55B. Corrective Gymnastics. Miss HAGELTHORN.

2 hrs., throughout the year; ½ unit each half-year. Hours to be arranged with instructor. Prerequisite: courses 53A–53B, 53C–53D.

60A–60B. Folk Dancing. Miss HAGELTHORN.

2 hrs., throughout the year; ½ unit each half-year. Tu Th, 11. Open to juniors and seniors. Prerequisite: courses 52A–52B, 52C–52D.

60C–60D. Folk Dancing. Miss HAGELTHORN.

2 hrs., throughout the year; ½ unit each half-year. M W, 3. Prerequisite: course 60A–60B.

61A–61B. Classic Dancing. Miss EISENHARDT.

2 hrs., throughout the year; ½ unit each half-year. M W, 2. Open to juniors and seniors. Prerequisite: courses 52A–52B, 52C–52D.

61C–61D. Classic Dancing. Miss EISENHARDT.

2 hrs., throughout the year; ½ unit each half-year. Tu Th, 3. Prerequisite: course 61A–61B.

64. Dancing.

Partheneia practice. Second half-year. No credit. Hours to be arranged. Prerequisite: for freshmen, enrollment in course 52A–52B; for students other than freshmen, one course in dancing in the department.

65A–65B. Gymnastics. Miss ELLIOTT.

2 hrs., throughout the year; ½ unit each half-year. Prerequisite: courses 52A–52B, 52C–52D. Two sections: I, M W, 11; II, Tu Th, 2.

*65C–65D. Gymnastics.

2 hrs., throughout the year; ½ unit each half-year. Prerequisite: course 65A–65B.

66C–66D. Gymnastics. Miss ELLIOTT.

2 hrs., throughout the year; ½ unit each half-year. M W, 11. Prerequisite: course 65C–65D.

74A–74B. Swimming. Miss GIBSON.

2 hrs., throughout the year, to be arranged. No credit. Sections: I, advanced; II, intermediate; III, elementary.

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84A–84B. General Recreative Course. Miss ROOF.
2 hrs., throughout the year. M W, 5. No credit. Open with the consent of the instructor to students not taking other work in the department and to women of the faculty, also to women employees of the University.

UPPER DIVISION COURSES

151. Kinesiology. Miss HAGELTHORN.
3 hrs., first half-year; 3 units. M W F, 1. Prerequisite: Anatomy 102.

152. Theory and Practice of Corrective Gymnastics. Miss HAGELTHORN.
2 hrs., second half-year; 2 units. Prerequisite: course 151.

153A–153B. Practice of Corrective Gymnastics. Miss HAGELTHORN.
2 hrs., throughout the year; 1 unit each half-year. Prerequisite: course 152.

160A–160B. Theory and Practice of Teaching Folk Dancing. Miss HAGELTHORN.
1 hr., throughout the year; 1 unit each half-year. Th, 8. Prerequisite: course 60A–60B.

161A–161B. Theory and Practice of Teaching Classic Dancing. Miss EISENHARDT.
1 hr., throughout the year; 1 unit each half-year. F, 8. Prerequisite: course 61A–61B.

165A–165B. Theory and Practice of Gymnastic Teaching. Miss ELLIOTT.
2 hrs., throughout the year; 2 units each half-year. Tu Th, 9. Prerequisite: courses 65A–65B, 151, and consent of the instructor.

170. Teaching of School and Playground Games. Miss HAGELTHORN.
2 hrs., second half-year. Tu Th, 8.

*171. Theory and Practice of Athletic Supervision. Department STAFF.
1 hr., either half-year. Prerequisite: a working knowledge of at least two team games.

175. Theory of Physical Education and Recreation. Assistant Professor CLEVELAND.
3 hrs., second half-year. M W F, 3. Prerequisite: course 165A–165B.

GRADUATE COURSES

250. Seminar. Assistant Professor CLEVELAND.
Topic for the year 1917–18: Current tendencies in physical education. Second half-year. Hours to be arranged. Prerequisite: course 175.

265. Studies in Gymnastic Teaching. Miss ELLIOTT.
Hours to be arranged. Prerequisite: course 165B. Recommended in connection with Education 201.

* Not to be given, 1917–18.

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PHYSICS

FREDERICK SLATE, B.S., Professor of Physics.
E. PERCIVAL LEWIS, Ph.D., Professor of Physics.
WILLIAM J. RAYMOND, B.S., Associate Professor of Physics.
RALPH S. MINOR, Ph.D., Associate Professor of Physics.
ELMER E. HALL, Ph.D., Associate Professor of Physics.
RAYMOND B. ABBOTT, M.S., Instructor in Physics.
WENDELL P. ROOP, A.B., Instructor in Physics.
LLOYD T. JONES, Ph.D., Instructor in Physics.
WILLIAM R. STAMPER, Mechanician.
OSWALD G. STEINITZ, Mechanician.
Fifteen Assistants.

Courses 1A–1B to 3A–3B are fundamental and designed to meet the needs of students preparing for applications of physics, or advanced work in the subject itself. Students will profit greatly if they supplement the course of laboratory work regularly laid out. For credit in special and supplementary laboratory work see courses 18 and 118. The physical laboratory will be open six days a week throughout the year, and may be used, under the guidance of the instructors concerned, by advanced students. The equipment of the laboratories is modern and extensive, and the University Library contains complete sets of all the important physical journals, and the proceedings and transactions of most of the academies and other societies.

The laboratory *deposit* for courses 1A, 1B, 3A, and 3B is $10 each; for courses 2C and 2D, $5 each; for course 1AB, $15; and for other courses at the rate of $5 a half-year for each laboratory exercise a week, but no deposit or fee is required for the research courses 216, 218. The *fees* are: For courses 1A or 1B, $6; for 3A or 3B, $8; for 2C or 2D, $4; for 1AB, $12; for other courses, one-half the deposit. These amounts plus payment for special damage are deducted from the deposits and the balance is returned.

Students who choose upper division courses in physics must include an adequate amount of laboratory exercises in the work chosen; the instructors should be consulted on this point. Students who are preparing to specialize in physics should guide their work by these general suggestions: (1) The preferable choice for the prerequisite in physics is courses 2A–2B, 3A–3B. (2) It is advantageous to include courses 104A and 105A in any plan, because they give control of fundamental methods. (3) Selection among major courses in physics is limited in range, unless a foundation has been laid in differential and integral calculus. (4) Proper access to references cannot be had without power to read physics in French and German. (5) On special questions affecting individual cases confer early with members of the department concerned in the major courses likely to be selected.

Honor-students in the Upper Division.—No separate courses are given for honor-students. Provision is made for instruction of a special character in the cases of individuals who seem prepared and inclined to profit by it. See course 119A–119B.

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LOWER DIVISION COURSES

1A–1B. General Physics.
Associate Professor MINOR, Mr. ROOP, and Dr. JONES.
Mechanics, properties of matter and heat. Lectures, recitations, and laboratory exercises, each once a week.
5 hrs., throughout the year; 3 units each half-year. Lecture: Sec. A, Tu, 9; Sec. B, W, 1; Sec. C, Th, 9. Recitation sections: 1, 2, 3, 4, M, 1; 5, 6, 7, 8, Tu, 9; 9, 10, Tu, 11; 11, 12, W, 8; 13, 14, 15, 16, Th, 9; 17, 18, Th, 11; 19, 20, 21, 22, F, 1; 23, S, 8; 24, S, 9. Laboratory sections: I, M, 2–4; II, Tu, 10–12; III, Tu, 2–4; IV, W, 2–4; V, Th, 10–12; VI, Th, 2–4; VII, F, 2–4; VIII, S, 10–12. The fifth hour will be used for supplementary laboratory work or for conferences. Prerequisite: matriculation subject 11. Prescribed in the colleges of engineering and chemistry, and in the school of architecture. Open to other students by special permission.

1AB. General Physics. Associate Professor MINOR and Dr. JONES.
Identical in scope and subject matter with course 1A–1B, but intended for students entering in January, 1918. Other students to be admitted by special permission only.
10 hrs., second half-year; 6 units. Lectures, M Th, 8. Recitation sections: 1, Tu F, 8; 2, W S, 8. Laboratory sections: I, M F, 2–4; II, Tu Th, 2–4.

2C–2D. General Physics.
Associate Professors MINOR and HALL, and Mr. ABBOTT.
Magnetism, electricity, wave motion, sound, light, and energy transformations, presented as a continuation of course 1A–1B. Two lectures and one laboratory exercise each week.
5 hrs., throughout the year; 3 units each half-year. Lectures: Sec. A, W F, 8; Sec. B, W F, 10. Eight laboratory sections: M Tu W Th F, 1–4; Tu Th S, 9–12. Prescribed in the colleges of engineering and chemistry.

2A–2B. General Physics.
Professor LEWIS and Associate Professor MINOR.
Lectures with experimental illustration and problems. Properties of matter, mechanics, heat, sound, light, energy transformation, electricity, and magnetism.
3 hrs., throughout the year. Prerequisite: matriculation subject 11, which may be waived in cases of distinct merit. Some knowledge of plane trigonometry is desirable. Sec. I, elective in the College of Letters and Science, M W F, 3, Professor Lewis. Sec. II, primarily for pre-medical students, Tu Th S, 11, Associate Professor Minor.

3A–3B. Physical Measurement. Associate Professor MINOR.
Experimental work in mechanics, properties of matter, heat, sound, light, electricity, and magnetism, requiring quantitative results. Methods are selected so as to show instructive relations of physical principles, and their adaptation to practical problems. Laboratory exercises twice a week. These courses are usually taken in conjunction with 2A–2B. Prerequisite: matriculation subject 11.
6 hrs., throughout the year; 2 units each half-year. Sec. I, M F, 1–4; II, Tu Th, 1–4; III, W, 1–4; S, 8–11.

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18. Special Undergraduate Study. Associate Professor MINOR.

All special laboratory work of lower division grade not included in courses announced above. Credit value to be fixed in each case. By special arrangement this course may be made the equivalent of parts of the regular laboratory work under courses 1A–1B, 2C–2D, 3A–3B.

Courses assigned to "The Staff" in what follows are in charge of a committee of which Professor E. P. Lewis is chairman. Students planning to enter any of these courses are directed to confer with him before enrolling, about subject and assignment to instructor.

Courses 118, 119A–119B, and 219A–219B are laid out by special agreement and designed to introduce capable students to advanced topics, in preparation for the systematic study which is the aim of the upper division and the graduate work.

UPPER DIVISION COURSES

104A–104B. Physical Laws in Terms of Vector Analysis. Professor SLATE.

An introduction to vector methods, developing them in connection with their application to selected physical problems. Open to qualified students.

2 hrs., throughout the year. Tu Th, 9.

105A–105B. Analytic Mechanics. Professor SLATE.

The mathematical treatment of principles of dynamics that are fundamental, illustrated by problems and applications.

3 hrs., throughout the year. M W F, 9. Prerequisite: the equivalent of matriculation physics, and some working power in differential and integral calculus.

*106. Historical Development of Physical Ideas. Professor SLATE.

Some critical epochs; the turning-points in experimental evidence and the logic of the conclusions drawn from it. Open to qualified students.

2 hrs., second half-year. M W, 11.

107A–107B. Electrical Measurements. Associate Professor RAYMOND.

The principles of electricity and magnetism, with applications to the measurement of magnetic field, direct and alternating electric current, electro-motive force, resistance, power, illumination, magnetic permeability and the energy losses in iron, electric capacity, inductance and impendance. Calibration and use of the more important types of measuring instruments.

107A. Two lectures and one laboratory exercise a week.
5 hrs., first half-year; 3 units. Lectures, Tu Th, 10; laboratory sections: I, Tu, 1–4; II, W, 1–4. Prerequisite: course 2C–2D, Mathematics 9 and 109 or 3–4.

107B. One lecture and two laboratory exercises a week.
7 hrs., second half-year; 3 units. Lectures, W, 10. Laboratory sections: I, M F, 1–4; II, Tu Th, 1–4. Prerequisite: course 107A.

* Not to be given, 1917–18.

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*108. Physical Optics. Associate Professor HALL.

Lectures with experimental illustrations and recitations, on selected topics in light, relating to the theory of optical instruments.

2 hrs., second half-year. Tu Th, 11. Prerequisite: course 2A–2B and Mathematics 9.

108A. Polarized Light. Associate Professor MINOR.

Laboratory work, with occasional lectures. Methods of producing and detecting plane, circularly, and elliptically polarized light. Practical applications in crystallography, saccharimetry, and metallic reflection. Optical activity.

6 hrs., second half-year; 2 units. Prerequisite: courses 2A–2B, and 3A–3B, or their equivalents.

109A, 109B. Properties of Matter. Mr. ROOP.

109A. Lectures, discussions and problems on gravitation, elasticity, compressibility, capillarity, viscosity, diffusion and rudiments of kinetic theory.

2 hrs., first half-year. Prerequisite: course 1A–1B or its equivalent, and a working knowledge of calculus.

109B. Laboratory work supplementing course 109A by the individual study of experimental problems.

3 or 6 hrs., either half-year; 1 or 2 units.

110A–110B. Electricity. Associate Professor RAYMOND.

Elementary theory of magnetism and electricity, illustrated with problems and applications. One lecture or recitation and two laboratory exercises each week.

7 hrs., throughout the year; 3 units each half-year. Lectures, W, 9; laboratory, Tu W, 2–4. Prerequisite: the equivalent of course 2A–2B and working power in differential and integral calculus.

111A, 111B. Electric Discharges through Gases. Professor LEWIS.

111A. Lectures, experimentally illustrated, on phenomena of the flame and electric arc, spark, and vacuum tube; and on cathode rays, Röntgen rays, and radio-activity.

2 hrs., first half-year. M W, 11. Prerequisite: course 2A–2B. This course is recommended as preliminary to course 211–211C.

111B. Laboratory work supplementing course 111A by the individual study of experimental problems.

3 or 6 hrs., first half-year; 1 or 2 units.

112A. Energetics. Professor SLATE.

A non-mathematical account of forms and transformations of energy. Lectures open to qualified students.

2 hrs., second half-year. Tu Th, 11.

* Not to be given, 1917–18.

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112B. Heat Measurements. Associate Professor HALL.

Selected problems in thermometry, calorimetry, pyrometry, intensity of radiation, and general heat measurements, adapted for students in physics, chemistry and engineering. Laboratory work with readings and discussions.

6 hrs., either half-year; 2 units. Tu Th, 1–4.

113. Physical Optics. Associate Professor HALL.

Laboratory exercises connected with course 108, and in extension of it.

6 hrs., either half-year; 2 units. Tu Th, 1–4.

114. Sound. Associate Professor RAYMOND.

Laboratory work with occasional lectures and discussions. An experimental treatment of sound sources, and of progressive and stationary waves of sound.

6 hrs., second half-year; 2 units. Prerequisite: the equivalent of course 2A–2B, and working power in differential and integral calculus.

115A–115B. Laboratory Technique. Dr. JONES.

General ideas underlying the construction and adaptation of apparatus for research. Adjustments and laboratory technique, including glass-blowing. Open to qualified students.

3 hrs., throughout the year; 1 units each half-year. Th, 1–4.

118. Special Undergraduate Study. The STAFF.

All special laboratory work of upper division grade not included in courses announced above. Credit value to be fixed in each case

119A–119B. Special Undergraduate Study. The STAFF.

Selected topics for reading, intended primarily for honor-students.

Throughout the year. Credit to be arranged.

GRADUATE COURSES

206A. Harmonic Motion. Associate Professor RAYMOND.

The analytical treatment of vibratory and wave motion, with application to sound, light, and electricity. Lectures with experimental illustrations.

2 hrs., first half-year. Tu Th, 8. Prerequisite: courses 2A–2B and 105A–105B, or their equivalents.

206B. Electric Waves and Oscillations. Associate Professor RAYMOND.

Lectures, with experimental illustrations.

2 hrs., second half-year. Prerequisite: course 206A.

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211–211c. Spectroscopy. Professor Lewis.

211. Lectures, with experimental illustrations, on methods and results of investigation, and spectroscopic theories.

2 hrs., second half-year. Prerequisite: course 108. Course 111a will also be found helpful.

211c. Laboratory work for students who wish to familiarize themselves with the use of spectroscopic apparatus, or to supplement course 211 by the individual study of experimental problems.

212. Thermodynamics. Associate Professor Hall.

Lectures.

2 hrs., first half-year. Tu Th, 10.

213. The Kinetic Theory of Matter. Mr. Roop.

Lectures, discussions, and readings on the topics: kinetic theory of gases, equation of condition of vapors and liquids; specific heats; metallic conduction; and the application of kinetic theory to electrical problems.

2 or 3 hrs., either half-year. Prerequisite: courses 105a–105b, and 111a.

215. Dynamics of Rotation. Professor Slate.

Theory of the gyroscope, and related problems.

3 hrs., first half-year. M W F, 11. Prerequisite: courses 104a, 105a–105b.

*215a. Precession and Nutation. Professor Slate.

2 hrs., first half-year. M W, 11, in alternate years with course 215. Prerequisite: course 215.

216a–216b. Special Advanced Study and Research. (Research Course.) The Staff.

Laboratory work throughout the year, on problems assigned according to the preparation and needs of individual students. Credit value to be fixed in each case.

217a–217b. Readings and Discussions. Professor Slate.

Work for graduates upon topics selected in consultation. For 1916–17 the special subjects were vector operators in physics, and electron dynamics treated by vector methods.

2 hrs., throughout the year. Tu Th, 11.

218a–218b. Graduate Laboratory Work. (Research Course.) The Staff.

Throughout the year. Credit to be arranged individually.

219a–219b. Special Graduate Study. The Staff.

Selected topics for reading. During the year 1916–17 special topics thus treated were selected within the range of Thermodynamics, Hydrodynamics and Physical Optics.

Throughout the year. Credit to be arranged individually.

220. Teachers' Course. Associate Professor Hall.

A seminar designed for prospective teachers of physics.

3 hrs., second half-year. Tu Th S, 11.

* Not to be given, 1917–18.

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PHYSIOLOGY

SAMUEL S. MAXWELL, Ph.D., Associate Professor of Physiology.
THEODORE C. BURNETT, M.D., Assistant Professor of Physiology.
ROSALIND WULZEN, Ph.D., Instructor in Physiology.
LILLIAN M. MOORE, M.S., Instructor in Physiology.
GEORGE H. MARTIN, A.B., Assistant in Physiology.
JOHN A. LARSON, M.A., Assistant in Physiology.

Courses 1 and 2 are designed to meet the needs of students who wish to obtain an elementary knowledge of the subject matter and methods of physiology. While no prerequisite is insisted upon, students who have not had the equivalent of matriculation chemistry will find themselves at a disadvantage.

Honor-students in the Upper Division.—Honor-students in physiology should be prepared in physics and inorganic and organic chemistry. They should also have some knowledge of human or comparative anatomy. The following courses will be required: Physiology 1, 2, 108A–108B, 109A–109B, and 110 or 111A–111B; Zoology 1A, 1B may be substituted for Physiology 2. The following courses will be acceptable as a part of the requirement of 24 units in physiology if presented by the student in a programme approved by the department: Anatomy 101, 102, 103; Biochemisty 101; Chemistry 100, 102A, 110, 111. Hygiene 108A–108B. Philosophy 106, 107, 142, 143. Physical Education for Women 165, 175. Physical Education for Men 102AB.

Honor-students will be given special facilities and guidance in all courses, especially in course 111.

The equipment in the Rudolph Spreckels Physiological Laboratory comprises in addition to the apparatus and conveniences for the customary lines of work in mammalian physiology, facilities for research in general physiology and experimental biology. The department library contains complete sets of all the important physiological journals, and the more important monographs on physiological and related subjects.

LOWER DIVISION COURSES

1. Introductory Physiology. Assistant Professor BURNETT.

A general outline of physiology with special reference to the human; designed for non-medical students. This course is introductory to all other work in the department except course 107.

8 hrs., first half-year; 4 units. Lectures, Tu Th, 1; laboratory, three sections: I, Tu Th, 2–5; II, M F, 1–4; III, W, 1–4, S, 8–11.

2. Introductory Biology. Dr. WULZEN.

General survey of the field of biology, with experimental work on various life phenomena. Free elective.

8 hrs., second half-year; 4 units. Lectures, Tu Th, 10; laboratory: Sec. I, M W, 1–4; Sec. II, Tu Th, 1–4.

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UPPER DIVISION COURSES

104. Physiology.
Associate Professor MAXWELL and Assistant Professor BURNETT.

Physiology of muscle, nerve, central nervous system and sensation, circulation, respiration, and secretion.

21 hrs., second half-year; 10 units. Lectures, M Tu W Th S, 11; F, 10. Laboratory, M Tu W Th S, 8–11. Prerequisite: Anatomy 101. For students matriculated in the Medical School.

107. Physiology. Assistant Professor BURNETT.

A general course in human physiology for students in public health.

8 hrs., first half-year; 4 units. Lectures, Tu Th, 8; laboratory, Tu Th, 9–12. Prerequisite: Anatomy 102, Chemistry 1A–1B.

108A–108B. Physiology, Human and Comparative.
Associate Professor MAXWELL.

(A) Physiology of muscle, nerve, the central nervous system and the special senses. (B) Physiology of the circulation; respiration, digestion, nutrition and reproduction.

3 hrs., throughout the year. M W F, 9. Prerequisite: Physics, Chemistry, Physiology 1 and 2, Zoology 1A, 1B. May be substituted for course 2.

109A–109B. Associate Professor MAXWELL and Mr. LARSON.

Laboratory course supplementary to 108A–108B.

6 hrs., throughout the year; 2 units each half-year. Tu Th, 9–12.

110. Experimental Biology. Dr. WULZEN.

Experimentation on cell processes and the tropic reactions. Introductory training in methods of research.

6 hrs., first half-year; 2 units. Tu Th, 1–4. Prerequisite: course 2 or Zoology 1A, 1B and matriculation chemistry.

111A–111B. Special Laboratory Work. The STAFF.

Students who have completed satisfactorily a sufficient amount of advanced work may take up special laboratory or research problems under the direction and supervision of some member of the staff.

6 to 9 hrs., throughout the year; 2 or 3 units. Hours and units must be arranged in advance.

113. Physiology of Infancy. Dr. WULZEN.

The normal infant; its various physiological processes, as digestion, sensation, growth.

2 hrs., first half-year. Tu Th, 8. Prerequisite: a knowledge of human physiology equivalent to that obtained in course 1.

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115. **The Physiology of Exercise.**
Associate Professor MAXWELL and Mr. MARTIN.

Laboratory practice with occasional informal lectures. The class will be limited to six members who will be selected on the basis of interest and preparation. The effects of exercise on the physiological processes; practice in the use of the ergograph, the plethysmograph; measurement of blood pressure and respiratory quotient.

6 hrs., first half-year; 2 units. M W F, 10–12.

116. **Physiology in Secondary Schools.** Associate Professor MAXWELL.

Purpose, content and methods of physiology in secondary schools.

1 hr., first half-year. M, 4.

GRADUATE COURSES

212. **Research in Physiology.**
Associate Professor MAXWELL and Assistant Professor BURNETT.

214. **Journal Club.** The STAFF.

Discussion of important advances in physiology, reports of research in the department, and abstracts of current papers. Open only to advanced students who have a reading knowledge of French and German. Application for membership should be made to Professor Maxwell.

1 hr., first half-year. Tu, 5.

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POLITICAL SCIENCE

[2]DAVID P. BARROWS, Ph.D., LL.D., Professor of Political Science.

BERNARD MOSES, Ph.D., LL.D., Professor of History and Political Science, Emeritus.

EDWARD ELLIOTT, Ph.D., Professor of International Law and Politics.

*THOMAS H. REED, A.B., LL.B., Associate Professor of Government.

LUDWIK EHRLICH, D.Jur., Lecturer in Political Science.

WILLIAM MACDONALD, Ph.D., LL.D., Lecturer in Political Science.

J. R. DOUGLAS, Ph.D., Instructor in Political Science.

The general prerequisites to courses in the upper division are Political Science 1A and 1B or satisfactory equivalent.

Honor-students in the Upper Division.—The department of political science will give honors on the basis of 24 units of work under its control, most of which must be passed with first and second grades. A certain amount of it may be taken in jurisprudence, history, economics or possibly even in other departments. The bulk of it should be chosen from upper division courses in political science. There will not be a rigid prescription of courses, but each applicant's course of studies will be considered on its merits. This should be made up, as completely as possible, at the beginning of the junior year, in consultation with the member of the department designated as Supervisor of Honor-candidates. All schedules are subject to approval by the department as a body.

Course 199 is designated as an Honor-Course in Politics. It is open by special permission to students seeking honors, or other qualified students. The course consists primarily of extensive reading in politics and examination of actual government. Freedom of choice and effort is encouraged. A maximum credit of 4 units a half-year is offered. In addition, honor-students may, and preferably should, in the senior year take the graduate course in political theory.

The final test of the fitness of candidates for distinction takes the form of an oral examination in the last half of the senior year. Written work of each applicant, prepared at any time during the college course, is examined and the general knowledge of government, American and foreign, foreign relations, and political theory, is tested.

LOWER DIVISION COURSES

1A. Government. Professor MACDONALD.

The government and parties of Great Britain, France, Italy, Belgium, and other countries having a parliamentary form of government.

3 hrs., first half-year. M W F, 3.

1B. Government. Professor MACDONALD.

The government and parties of Switzerland, Austria-Hungary, Germany and the United States.

3 hrs., second half-year. M W F, 3.

*Absent on leave, 1917–18.

[2] In residence, second half-year only, 1917–18.

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UPPER DIVISION COURSES

101. **Theory of the State.** Professor ELLIOTT.

An introductory study of the fundamentals of politics.

2 hrs., first half-year. M W, 2.

102. **American Political Institutions.** Professor ELLIOTT.

A study of the origin and development of political institutions in the United States. Recommended for students whose major is political science and for students seeking a major recommendation to teach government in high schools.

2 hrs., second half-year. M W, 2.

*103. **The Government of Dependencies.** Professor BARROWS.

A brief general survey of modern colonial government, followed by more detailed study of one or more dependent possessions.

3 hrs., first half-year. M W F, 9. 1918–19 and alternate years.

*105. **International Relations: Spanish America.** Professor BARROWS.

Special attention is given to the government and politics of Mexico, Central America, and the Caribbean, and the relations of these regions with the United States.

3 hrs., first half-year, 1917–18, and alternate years. M W F, 9.

*106. **International Relations: the Far East.** Professor BARROWS.

Governments of China and Japan; interests and dependencies of European states; American policy in the Orient.

3 hrs., second half-year, 1917–18, and alternate years. M W F, 9.

110A. **The Government of Cities.** Dr. DOUGLAS.

The development and present status of the governmental organization and activities of German, French, British, and American cities.

3 hrs., first half-year. M W F, 2.

110B. **Municipal Administration.** Dr. DOUGLAS.

The principles and methods according to which cities perform their functions, especially in the United States.

3 hrs., second half-year. M W F, 2.

*112. **State Government.** —— ——.

The first half of the course is based on a study of the government of California. The second half is devoted to party organization and activities.

3 hrs., second half-year, 1918–1919, and alternate years. M W F, 9.

* Not to be given, 1917–18.

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*115. The Principles and Law of Public Administration. Professor BARROWS.

The development of public administration, especially in the United States; the organization of administrative departments, obligations of administrative officers, and the methods by which administrative action is reviewed and controlled.

2 hrs., first half-year. Tu Th, 9.

117. History of European Political Institutions. Dr. EHRLICH.

From the later Middle Ages until modern times.

3 hrs., first half-year. M W F, 3.

118. Administrative Law of Modern European States. Dr. EHRLICH.

3 hrs., second half-year. M W F, 3.

199A–199B. Honor-course. The STAFF.

Throughout the year. Hours to be arranged.

GRADUATE COURSES

The scope of instruction in this department includes modern governments, their administration and internal politics; international relations, particularly of the Far East and of Spanish America and the Caribbean; the government of dependencies; state government and administration; local and municipal government in Europe and America; political theories; administrative and legislative methods and problems. Courses in public law are offered in the department of jurisprudence, and candidates for the doctor's degree who offer political science as a major are expected to take courses in Constitutional Law of the United States and International Law, with study of leading cases.

The department is prepared to direct advanced study and research in the following fields: Administrative development in state and municipal government in the western states of the Union; comparative American legislation; the government of the Mexican Republic; the government of American dependencies; international relations in the Pacific; the government of England.

The University Library is equipped for the study of the government and politics of Western Europe, the United States, and Spanish America. Its collections are being added to for the study of the Far East and the Pacific. The Bancroft Library contains extensive materials, which are being increased, for study of the institutions and politics of Spanish North America.

201A. Political Science. Professor ELLIOTT.

A reading course in political writings: Plato's Republic; Aristotle's Politics; Macchiavelli's Prince; Hobbes's Leviathan; Locke's Essays on Government; Montesquieu's Spirit of the Laws; Rousseau's Social Contract.

3 hrs., first half-year. Tu Th, 8:30–10.

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201B. Political Science. Professor ELLIOTT.

The reaction against the doctrines of the eighteenth century, as represented by the writings of De Maistre and Burke; Godwin's Political Justice; Bentham's Fragments on Government, and Principles of Morals and Legislation; Austin's Province of Jurisprudence; Mill's Essay on Liberty and Representative Government; the social and political doctrines of August Comte; Bagehot's Physics and Politics; exponents of scientific anarchism and of state socialism; modern writers, chosen according to preference of the class.

3 hrs., second half-year. Tu Th, 8:30–10.

*204A–204B. Seminar in Foreign Relations. Professor BARROWS.

2 hrs., throughout the year. Th, 2–4.

*205A–205B. Seminar in Administration. Professor BARROWS.

The seminar as a body makes a study of federal, state, local and municipal administration with special reference to California.

2 hrs., throughout the year. Tu, 2–4.

*206. The Government of Mexico. Professor BARROWS.

Investigation of federal, state, and municipal government, and of social and political conditions in the Mexican Republic. A knowledge of Spanish is prerequisite. Students who present doctor's theses in this field should expect to complete their study in Mexico.

First half-year. Hours and credit to be arranged.

*207. The Government of the Philippines. Professor BARROWS.

Investigation of the institutions of the Philippines under Spanish and American rule; the policies pursued; the development of the Filipino peoples under these influences. A knowledge of Spanish is required.

Second half-year. Hours and credit to be arranged.

208A–208B. Municipal Government. Dr. DOUGLAS.

Investigation of actual problems of municipal government with special reference to administration.

2 hrs., throughout the year. W, 4–6.

209A–209B. Seminar in the Public Law of Modern European States. Dr. EHRLICH.

Weekly papers and theses to be written by members of the class. Special attention will be given to the study of statutes and judicial decisions.

2 hrs., throughout the year; 2 units each half-year. Th, 2–4.

210A–210B. Seminar in the History of European Political Institutions. Dr. EHRLICH.

Weekly papers and theses to be written by members of the class. Special attention will be given to the study of original sources.

2 hrs., throughout the year; 2 units each half-year. Tu, 2–4.

* Not to be given, 1917–18.

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PUBLIC HEALTH

Instruction in the subjects which form the three curricula leading to the degree of Graduate in Public Health, as outlined in the Circular of Information, Academic Departments, is given in the departments listed below. For details regarding courses of instruction the student is referred to the announcements of the departments concerned, and to the Committee on Public Health Study-lists.

Departments in Berkeley

Agriculture (Entomology, Nutrition, Veterinary Science), Anatomy, Biochemistry and Pharmacology, Civil Engineering, Economics, Hygiene, Pathology and Bacteriology, Physiology, Political Science, and Zoology.

Departments of the Medical School in San Francisco

Clinical Neurology, Dermatology, Laryngology, Legal Medicine, Medicine, Ophthalmology, Orthopedic Surgery, Pediatrics, Surgery, and Urology.

Committee on Public Health Study-Lists

Professors Legge (chairman), Lucas, Force, and Hyde.

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PUBLIC SPEAKING

MARTIN C. FLAHERTY, Ph.B., Associate Professor of Forensics.
CHARLES D. VON NEUMAYER, Assistant Professor of Public Speaking.
—— ——, Lecturer in Vocal Interpretation.
—— ——, Instructor in Public Speaking.
GEORGE BOAS, Ph.D., Instructor in Public Speaking.
ANNIE H. ALLEN, M.A., Instructor in Public Speaking.
A. HOWARD HANKEY, A.B., Teaching Fellow in Public Speaking.

Honor-students in the Upper Division.—Candidates must arrange their programmes so as to include in their upper division work 8 units in voice culture, 8 units in vocal interpretation, and 8 units in oral expository composition. In applying this rule the department stands ready to modify its provisions to meet exceptional cases. Candidates, for instance, who have been advanced to the honor-status in English will be permitted to offer a certain proportion of major units in that subject in partial satisfaction of the requirement for honors in public speaking.

LOWER DIVISION COURSES

1A–1B. Elements of Public Speaking.
Associate Professor FLAHERTY, Dr. BOAS, Mr. HANKEY, and Mr. ——.

Training in fundamental processes; organization and arrangement of material; practice in speaking.

3 hrs., throughout the year. Seven sections: M W F, 8, 9, 10, 2, 3; Tu Th S, 9, 10.

2A–2B. Elements of Expression and Interpretation. Miss ALLEN.

A practical course in reading and speaking. Exercises to establish responsiveness of voice and body. For lower division students only.

3 hrs., throughout the year. Two sections, limited to fifteen each: M W F, 8, 10.

3A–3B. The Cultivation of the Speaking Voice. —— ——.

A scientific study of the laws governing the speaking voice; elimination of interference and fatigue; diction, enunciation, and pronunciation. Intensive study of selections from standard literature for public performance; simple voice practice in short speeches. Sections limited.

3 hrs., throughout the year. Two sections: Tu Th S, 9, 10.

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4A–4B. Vocal Expression. Assistant Professor VON NEUMAYER.
Drill in elocution, reading, and the declamation of original addresses.
2 hrs., throughout the year. Two sections: Tu Th, 9, 10.

5A–5B. Second Year Public Speaking.
Associate Professor FLAHERTY, Dr. BOAS, and Mr. ——.
(A) The rhetoric of oral discourse: the definition and division terms, arrangement and sequence of topics; amplification by repetition, illustration, contrast, detail, etc.
(B) Principles of argumentation: analysis of propositions, brief drawing, the nature and kinds of evidence.
2 hrs., throughout the year. Three sections: I, M W, 8; II, M W, 10; III, Tu Th, 8.

15A–15B. Corrective Work in Voice and Speech. Miss ALLEN.
Correction of such faults as nasality, breathiness, feebleness, harshness of voice, speaker's sore throat; lisping, stammering, etc. Control of nervousness. Classes limited to ten.
1 hr., throughout the year. Two sections: Tu, 1; Th, 1.

UPPER DIVISION COURSES

107A–107B. Oral Interpretation. Assistant Professor VON NEUMAYER.
Training in oral expression; a study of the fundamental principles of dramatic reading. Candidates for the teacher's recommendation with English as a major are advised to take this course in order to qualify for the final examination in oral English.
2 hrs., throughout the year. Tu Th, 11.

109A–109B. Studies in Interpretation. —— ——.
3 hrs., throughout the year. M W F, 2.

110A–110B. Third Year Public Speaking.
Associate Professor FLAHERTY and Dr. BOAS.
(A) Oral Argumentation and Debate. Preparation of briefs; presentation of arguments.
3 hrs., first half-year. Two sections: I, Th, 3–5; II, W, 3–5. Third hour by appointment for supervision of briefs and bibliographies. Prerequisite: course 5A–5B and some preliminary training in vocal expression.
(B) Practice in Extempore Speaking; the Preparation of the Occasional Address.
3 hrs., second half-year. Two sections: W, 3–5; Th, 3–5; third hour by appointment. Open to students selected from 110A. Students are advised to follow this course with English 121E–121F, Oral Debates on Literary Topics.

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111A–111B. Elements of Expression and Interpretation. Miss ALLEN.

The material of course 2A–2B adapted to the needs of upper division students who have had no previous training in expression. Class limited to twenty.

2 hrs., throughout the year. Tu Th, 3.

112A–112B. Expression and Interpretation: Advanced Course. Miss ALLEN.

2 hrs., throughout the year. Tu Th, 2. Sections limited to fifteen each. Prerequisite: course 2A–2B, or its equivalent.

114A–114B. Bible Reading. —— ——.

A careful study of selected portions of the Old and the New Testaments with a view to their effective rendering orally.

2 hrs., throughout the year. M W, 11.

116A–116B. Advanced training for qualified students who are preparing for public platform work. —— ——.

3 hrs., throughout the year. M W F, 3.

117A. Extemporaneous Discourse. Assistant Professor VON NEUMAYER.

Exercises in the presentation of extemporaneous speeches on specific questions drawn from a familiar central topic. Training in structure and delivery. Class limited to fifteen students.

2 hrs., first half-year. Tu, 3–5. Prerequisite: courses 1A–1B, 5A–5B, and the permission of the instructors.

118A–118B. Acting as an Art and as a Method of Interpretation. Assistant Professor VON NEUMAYER.

The psychology of acting; the cultivation and development of the dramatic instinct through character portrayal. Study and presentation of selected one-act plays. Open to students who have the permission of the instructor.

3 hrs., throughout the year. Sec. I, M, 10–12, W, 10; Sec. II, Th, 7–9 p.m., and a third hour to be arranged.

GRADUATE COURSES

210A–210B. Practical Bibliography and the Use of the Library. Associate Professor FLAHERTY.

Designed to meet the needs of prospective teachers of debating.

2 hrs., throughout the year. Alt. F, 11, and a second hour to be arranged.

220A–220B. Expression and Interpretation: A Course for Teachers. Miss ALLEN and —— —.

A review and discussion of methods, with special reports and criticisms of text-books.

2 hrs., throughout the year, to be arranged.

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ROMANIC LANGUAGES

[1]RUDOLPH SCHEVILL, Ph.D., Professor of Spanish.
GILBERT CHINARD, L. ès L., Professor of French.
GUSTAVE FAUCHEUX, B. ès L., B. ès Sc., Associate Professor of French Literature.
JOHN T. CLARK, Ph.D., Assistant Professor of Romanic Philology.
CARLOS BRANSBY, M.A., Litt.D., Assistant Professor of Spanish.
PERCIVAL B. FAY, Ph.D., Assistant Professor of Romanic Philology.
LESLIE M. TURNER, D. ès L., Assistant Professor of French.
S. GRISWOLD MORLEY, Ph.D., Assistant Professor of Spanish.
RAMON JAÉN, Assistant Professor of Spanish.
ALFRED SOLOMON, M.A., Instructor in French.
CAROLINE B. SINGLETON, M.A., Instructor in French.
EMILIO GOGGIO, M.A., Instructor in Italian.
WILLIAM GIRARD, Ph.D., Instructor in French.
JOHN A. MAGNI, Ph.D., Instructor in French.
ELIZABETH MCGUIRE, M.A., Instructor in Spanish.
MALBONE W. GRAHAM, D.D., Instructor in Spanish.
LOUIS BARNIER, A.B., Instructor in French.
BEATRICE Q. CORNISH, M.A., Assistant in Spanish.
RAFAEL ECHEVERRIA, A.B., Assistant in Spanish.
EUGENE JORALEMON, A.B., Assistant in Romanic Languages.

No student will be permitted to begin more than one Romanic language in any one half-year.

Honor-students in the Upper Division.—No student will be admitted to candidacy who has not creditably completed all the lower division courses in his proposed major subject, or the equivalent of these courses. The candidate's record for each half-year must include at least sixty per cent of first and second grades in all courses, and work done in the department of Romanic languages must be first-grade work. The candidate must furthermore give evidence of real linguistic ability. Honor-students will be under the immediate supervision of a special committee appointed by the department. Each instructor will devote special attention to the honor-candidates who are in his courses, and direct their work along lines of general reading in connection with their major subject. Candidates will be encouraged to make extensive use of the library facilities.

The 24 units of upper division work which is controlled by the department must ordinarily include some courses in a Romanic language other than that of the major subject. Particular stress will be laid upon advanced composition and the elements of historical grammar. In addition to work done in courses, the candidates will be required to pass a final oral or written examination, in which they must demonstrate a reasonable acquaintance with the literature and historical background of their major subject, an exact knowledge of the grammar, and an ability to express themselves clearly in the language of the major subject.

[1] In residence first half-year only.

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FRENCH

LOWER DIVISION COURSES

AB. Elementary French.
Assistant Professor FAY, Mr. SOLOMON, Dr. MAGNI, Miss SINGLETON, and Mr. BARNIER.

Stress is laid on accurate pronunciation, on the essentials of grammar, and on careful translation into idiomatic English of simple French prose. The equivalent of matriculation subject 15a^2.

5 hrs., either half-year. First half-year: M Tu W Th F, 8, 9, 10, 1, 2; second half-year: M Tu W Th F, 8, 1, 2.

CD. Elementary French (Continuation of AB).
Assistant Professors FAY and TURNER, Mr. SOLOMON, Miss SINGLETON, Dr. GIRARD, Dr. MAGINI, and Mr. BARNIER.

Further study of grammar, especially syntax. Reading of contemporary French prose, plays, and some verse; conversation and composition. The equivalent of matriculation subject 15a^3.

5 hrs., either half-year. First half-year: M Tu W Th F, 8, 10, 1, 2; second half-year: M Tu W Th F, 8, 9, 10, 1, 2. Students will continue under the same instructor and in the same section as in AB. Changes in section may be made only by permission of the head of the department.

E–F. Intermediate French.
Assistant Professors CLARK, TURNER, and FAY.

A detailed study of syntax; dictation and memorizing of prose and verse; selections from novels and historical texts. The equivalent of matriculation subject 15a^4.

3 hrs., throughout the year. M W F, 8, 9, 10. [Section II at 9 o'clock, Professor TURNER, open only to candidates for the teacher's recommendation and to students who intend to have a major in French; limited to twenty-five, admitted by special permission of the instructor.] Prerequisite: courses AB, CD or credit for matriculation subject 15a^3, or its equivalent, or a special examination.

EF. Intermediate French (Continuation of CD of first half-year).
Assistant Professor TURNER, Mr. SOLOMON, Dr. GIRARD, and Assistants.

Syntax, conversation, and rapid reading.

5 hrs., second half-year. M Tu W Th F, 8, 1, 2.

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UPPER DIVISION COURSES

103A–103B. The Nineteenth Century.
Professor CHINARD, Associate Professor FAUCHEUX, Assistant Professor CLARK, and Dr. GIRARD.

A detailed study of standard authors, prose and verse, with dictation and reports on assigned themes, conducted mainly in French. Candidates will be admitted only by special permission, after consulting one of the above instructors.

3 hrs., throughout the year. M W F, 9, 10, 1, 2. Prerequisite: course E–F or EF or credit for matriculation subject 15*a*[4], or its equivalent, or a special examination.

106A–106B. Grammar and Conversation.
Assistant Professor CLARK and Mr. SOLOMON.

Exercises in written and oral expression. It is advisable to take this course in connection with course 103A–103B. Special permission to enroll must be obtained from one of the above instructors.

2 hrs., throughout the year. Tu Th, 9, 11. Prerequisite: same as for course 103A–103B.

107A–107B. A Survey of French Literature. Professor CHINARD.

A study of the principal writers with selections from their most important works. Conducted mainly in French and open only to seniors.

2 hrs., throughout the year. Tu Th, 9.

112A–112B. The Nineteenth Century Drama.
Assistant Professor TURNER.

A survey of the dramatic production of French Romanticism. Conducted mainly in French.

3 hrs., throughout the year. M W F, 8.

117A–117B. Teachers' Course. Assistant Professor TURNER.

Methodology, bibliography, analysis of French texts, study of style. For those who intend to teach or prepare for advanced studies. Open only to seniors and graduates.

2 hrs., throughout the year. Tu Th, 11.

120A–120B. Classical Drama. Associate Professor FAUCHEUX.

(A) Corneille and Racine, with collateral study of Descartes and Pascal.

(B) Molière and the comedy of character; brief consideration of La Fontaine and La Bruyère.

3 hrs., throughout the year. M W F, 9.

129A–129B. Special Study. The STAFF.

Any instructor in Romanic languages will advise and assist students who propose to undertake special advanced study.

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130A–130B. Grammar, Composition, and Conversation. First Course.
Assistant Professor FAY.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: section II of E–F (TURNER), or special permission of the instructor; chiefly for candidates for the teacher's recommendation.

130C–130D. Studies in French Style and Practice in Composition. Second Course. Professor CHINARD.

2 hrs., throughout the year. Tu Th, 10. Prerequisite: first or second grade in course 130A–130B, or special permission of the instructor.

*132A–132B. Outline of the History of the French Language.
Assistant Professor CLARK.

2 hrs., throughout the year. Tu Th, 11. Prerequisite: course 103A–103B, or 106A–106B, or 130A–130B. Alternates with 134.

134A–134B. The Syntax of the Seventeenth Century.
Assistant Professor FAY.

2 hrs., throughout the year. Tu Th, 11. Prerequisite: course 103A–103B, or 106A–106B, or 130A–130B. Alternates with 132.

136A–136B. History and Literature. Mr. JORALEMON.

The historical background of the chief periods of the Romanic literatures. Reading and reports. For candidates for the teacher's recommendation.

1 hr., throughout the year. W, 1.

SPANISH

(See introduction to the corresponding division in French.)

AB. Elementary Spanish.
Miss MCGUIRE, Dr. GRAHAM, Mrs. CORNISH, Mr. ECHEVERRIA, and Assistants.

Stress is laid on accurate pronunciation, Castilian being the standard, on the essentials of grammar, and on careful translation into idiomatic English of simple Spanish prose. The equivalent of matriculation subject $15c^2$.

5 hrs., either half-year. First half-year: M Tu W Th F, 8, 9, 10, 1, 2; second half-year: M Tu W Th F, 8, 1, 2.

* Not to be given, 1917–18; given in alternate years.

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CD. Elementary Spanish (Continuation of AB.)
Professor SCHEVILL, Miss MCGUIRE, Dr. GRAHAM, Mrs. CORNISH, Mr. ECHEVERRIA, and Assistants.

Further study of grammar, especially syntax. Reading of contemporary Spanish prose, plays and some verse. Conversation and composition. The equivalent of matriculation subject $15c^3$.

5 hrs., either half-year. First half-year: M Tu W Th F, 8, 9, 1, 2: second half-year: M Tu W Th F, 8, 9, 10, 1, 2. Students will continue under the same instructor and in the same section as in AB. Changes in section may be made only by permission of the head of the department.

E–F. Intermediate Spanish.
Assistant Professors MORLEY and JAÉN and Miss MCGUIRE.

A detailed study of syntax, dictation and memorizing of prose and verse; conversation; selections from modern texts. The equivalent of matriculation subject $15c^4$. Conducted chiefly in Spanish.

3 hrs., throughout the year. M W F, 9, 1, 2. Prerequisite: courses AB, CD, or credit for matriculation subject $15c^3$ or its equivalent, or a special examination.

EF. Intermediate Spanish (continuation of CD of first half-year). Syntax. conversation, and rapid reading.

5 hrs., second half-year. M Tu W Th F, 8, 1, 2.

UPPER DIVISION COURSES

A. PRIMARILY FOR JUNIORS

103A–103B. The Nineteenth Century. Assistant Professor MORLEY.

A detailed study of standard authors, prose and verse with dictation and reports on assigned themes. Limited to forty students, admitted by special permission of instructor only.

3 hrs., throughout the year. M W F, 10. Prerequisite: course E–F, or credit for matriculation subject $15c^4$, or its equivalent, or a special examination.

B. FOR JUNIORS AND SENIORS

105A–105B. The Modern Drama.
Assistant Professor MORLEY and Miss MCGUIRE.

A study of the chief plays of the most recent playwrights: Echegaray, Benavente, Galdós, the Quintero brothers, etc.

2 hrs., throughout the year. Two sections: I, Tu Th, 10; II, Tu Th, 2. Limited to thirty students in a section, admitted by special permission of the instructor.

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106A–106B. Conversation and Composition.
Professor SCHEVILL and Assistant Professor JAÉN.
Advanced written and oral expression.
3 hrs., throughout the year. M W F, 8, 9, 10.

C. PRIMARILY FOR SENIORS

107A–107B. A Survey of Spanish Literature. Assistant Professor MORLEY.
A study of the principal writers with selections from their most important works; lectures; reports to be made by the students on work assigned. Students are admitted only by special permission of instructor. Both 107A and 107B are required of candidates for the teacher's recommendation with Spanish as a major.
2 hrs., throughout the year. Tu Th, 9.

108A–108B. Spanish Prose and Verse. Assistant Professor JAÉN.
A study of fiction, drama and lyric poetry, chiefly of the nineteenth century.
3 hrs., throughout the year. M W F, 2.

129. Special Study. Professor SCHEVILL.
For students who wish to undertake special advanced work and to learn how to use the library.
First half-year. By appointment.

136A–136B. Required for the teacher's recommendation. See course 136 above under French.

ITALIAN

(See introduction to the corresponding division in French.)

LOWER DIVISION COURSES

AB–CD. Elementary Italian. Mr. GOGGIO.
Essentials of grammar. Short stories by contemporary writers.
5 hrs., throughout the year. M Tu W Th F, 8.

E–F. Intermediate Italian. Mr. GOGGIO.
A detailed study of syntax; dictation and memorizing of prose and verse; conversation; selections from modern texts.
3 hrs., throughout the year. M W F, 9. Prerequisite: course AB–CD.

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UPPER DIVISION COURSES

103A–103B. The Nineteenth Century. Mr. Goggio.

A detailed study of standard authors, prose and verse, with dictation and reports on assigned themes.

3 hrs., throughout the year. M W F, 10. Prerequisite: course E–F, or its equivalent, or a special examination.

*105A–105B. The Fifteenth and Sixteenth Centuries. Mr. Goggio.

A study of the chief writers of this period, with lectures and reports by the students.

2 hrs., throughout the year, to be arranged.

107A–107B. A Survey of Italian Literature. Mr. Goggio.

A study of the principal writers with selections from their most important works.

2 hrs., throughout the year, to be arranged.

GRADUATE COURSES

Students who enter the graduate division with the purpose of taking an advanced degree in the department of Romanic languages must have a good reading knowledge of Latin and German. They are also requested to attend the following course:

Romanic Seminar. A review of the most recent books bearing on the Romanic languages and literatures.

1 hr., fortnightly. F, 11 (alternating with the University meetings).

FRENCH

201A–201B. Modern French Literature. Professor Chinard.

A detailed study of some important French writers.

2 hrs., throughout the year. M, 3–5.

212A–212B. Historical French Grammar. Assistant Professor Clark.

Investigation in special topics.

2 hrs., throughout the year, to be arranged. Prerequisite: course 132A–132B and a reading knowledge of German.

220A–220B. Survey of Medieval French Literature.
Associate Professor Faucheux.

Lectures, assignments, and written reports twice a month.

2 hrs., throughout the year. M W, 4.

* Not to be given, 1917–18.

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225A–225B. Old French. Associate Professor FAUCHEUX.

Rapid reading: *Chanson de Roland; Aucassin et Nicolette; Lais* of Marie de France.

2 hrs., throughout the year. Th, 4–6. Prerequisite: permission of the instructor.

229A–229B. For students who wish to undertake special advanced work in French. Professor CHINARD.

Hours and credit to be arranged.

231A–231B. Seminar in French Literature. Professor CHINARD.

Literary investigation.

2 hrs., throughout the year. W, 4–6.

SPANISH

201A. Methods of Investigation. Professor SCHEVILL.

1 hr., first half-year, to be arranged.

*203A–203B. Cervantes. Professor SCHEVILL.

2 hrs., throughout the year. During weeks in which University meetings are held, M W, 11; other weeks, W F, 11.

205A–205B. Masterpieces of the Sixteenth and Seventeenth Centuries. Assistant Professor MORLEY.

2 hrs., throughout the year. W F, 5.

*208B. The Spanish Ballad. Assistant Professor MORLEY.

1 hr., second half-year, to be arranged. Given in alternate years.

229A. For students who wish to undertake special advanced work in Spanish. Professor SCHEVILL.

Hours and credit to be arranged.

Attention is called to German 208A–208B (Spanish Influences upon German Literature in the Seventeenth and Eighteenth Centuries.)

ITALIAN

201A–201B. Dante, Petrarch, and Boccacio. Mr. GOGGIO.

2 hrs., throughout the year, to be arranged.

* Not to be given, 1917–18.

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SANSKRIT

ARTHUR W. RYDER, Ph.D., Assistant Professor of Sanskrit.

UPPER DIVISION COURSES

MAJOR COURSES

101A–101B. Elementary Sanskrit. Assistant Professor RYDER.

Perry's Primer, Whitney's Grammar, Lanman's Reader. Grammar, composition, and reading.

3 hrs., throughout the year. M W, 11, and a third hour to be arranged.

102A–102B. Second-year Sanskrit. Assistant Professor RYDER.

Rapid reading of classical texts: the fables of the Hitopadeça, selections from the Kathāsaritsāgara and Daçakumāracarita.

3 hrs., throughout the year, to be arranged.

103A–103B. Advanced Classical Sanskrit. Assistant Professor RYDER.

(A) Reading of more difficult texts and study of their position in the literature: the Epigrams of Bhartrihari; the Meghadūta of Kālidāsa. (B) Introduction to the drama and to the Prākrit languages: the Çakuntalā of Kālidāsa; the Mricchakatika of Çūdraka.

3 hrs., throughout the year, to be arranged.

The reading matter of courses 102A–102B and 103A–103B may be varied in accordance with the tastes and purposes of the students.

SANSKRIT LITERATURE—FREE ELECTIVE COURSES

The following courses do not require a knowledge of any Indian language, and are open to all students of the upper division. Together, they aim to give an outline history of Sanskrit literature, but any one of them may be taken independently.

20. The Veda and the Philosophical Systems. Assistant Professor RYDER.

Lectures and reading. An outline of Vedic literature; the earlier forms of Brahmanism; the development of ritualism and philosophy; the revolt which found expression in Buddhism and Jainiism, the struggle between Brahmanism and Buddhism, and the rise of Hinduism.

2 hrs., first half-year. Tu Th, 11.

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21. Classical Sanskrit Literature. Assistant Professor RYDER.

Lectures and reading. Outline of the great epics and of the classical literature, exclusive of the drama: The Mahābhārata; the Rāmāyana; the Kāvya's (minor epics); lyric and elegiac poetry; novels and romances; fables and epigrams; the law books; rhetoric and poetics; scientific literature.

2 hrs., second half-year. Tu Th, 11.

GRADUATE COURSE

220. The Veda and the Philosophical Systems.
Assistant Professor RYDER.

An expansion of course 20 with added reading and the preparation of a thesis.

2 hrs., first half-year; 4 units. Tu Th, 11.

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SEMITIC LANGUAGES

WILLIAM POPPER, Ph.D., Associate Professor of Semitic Languages.
MARTIN A. MEYER, Ph.D., Lecturer in Semitic Literature and History.

Language Courses

The specific courses given in any year, the hours therefor, and the authors read, will depend upon the needs of the students. All courses except elementary courses may be repeated without duplication of credit and by agreement may be counted as graduate work; all are year courses, and open to any properly qualified student; excepting course 107A–107B, they will be given by Professor Popper.

Hebrew. Elementary (3A–3B, 3 hrs.); Second Year (104A–104B, 2 hrs.); Exegetical (206A–206B, 2 hrs.); Mishnaic (107A–107B, 1 hr., Tu, 1, Dr. Meyer); Medieval (207A–207B, 2 hrs.).

Arabic. Elementary (113A–113B, 2 hrs.); Prose (214A–214B, 2 hrs.); Koran and Poetry (215A–215B, 2 hrs.).

Syriac. Elementary (111A–111B, 2 hrs.); Advanced (212A–212B, 2 hrs.). Seminar (220A–220B, 2 hrs.).

Lecture Courses

Free elective courses not requiring a knowledge of any Semitic language.

7A–7B. History of the Hebrew Religion. Dr. MEYER.

1 hr., throughout the year. Tu, 1.

8A–8B. The Second Hebrew Commonwealth. Dr. MEYER.

The history and literature of the Hebrews in Palestine after the return from the captivity (536 B.C.).

1 hr., throughout the year. Tu, 2.

9A–9B. The Diaspora. Dr. MEYER.

The life and letters of the Jews after the fall of Jerusalem (70–1492 A.D.).

1 hr., throughout the year. Tu, 3.

10A–10B. Modern Jewish History. Dr. MEYER.

1 hr., throughout the year. Tu, 4.

25. Mohammedanism. Associate Professor POPPER.

2 hrs., either half-year; 1 unit. Tu Th, 11.

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SLAVIC LANGUAGES

GEORGE R. NOYES, Ph.D., Associate Professor of Slavic Languages.
ZDENKA BUBEN, A.B., Assistant in Bohemian.
ALEXANDER S. KAUN, Ph.B., Assistant in Russian.
MILUTIN KRUNICH, Assistant in Serbo-Croatian.

Honor-students in the Upper Division.—Candidates for honors must do 24 units of upper division work in the department, of which at least 16 must be of first grade. The 24 units must include at least 18 units of work in one Slavic language and also either course 160, course 162 or (with the approval of the department), course 199.

LOWER DIVISION COURSES

1A–1B. Elementary Russian. Associate Professor NOYES.
Bondar, Simplified Russian Method. Boyer and Speranski, Russian Reader. Practice in conversation.
3 hrs., throughout the year. M W F, 1.

6A–6B. Elementary Polish. Associate Professor NOYES.
Baluta, Practical Handbook of the Polish Language. Reading of Sienkiewicz and Mickiewicz.
3 hrs., throughout the year, to be arranged.

10A–10B. Elementary Serbo-Croatian. Mr. KRUNICH.
Petrovitch, Servian Conversation-Grammar. Reading of easy texts.
3 hrs., throughout the year. M W F, 1.

15A–15B. Elementary Bohemian. Miss BUBEN.
Jonas, Bohemian Made Easy. Beneš, Česká, čítanka.
3 hrs., throughout the year. M W F, 2.

By special arrangement with the Department, any one of the above four courses, with assigned readings in the history of Slavic literature, may be counted as work of the upper division. In such cases the student should register for course 101A, 106A, and the like, instead of in course 1A, 6A, etc.

18. Russian Conversation. Mr. KAUN.
Practice in elementary Russian conversation and composition.
2 hrs., first half-year; 1 unit. Tu Th, 11. Open only to those who are taking or have taken Russian 1A; not open to students entering the University from schools in the Russian Republic.

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UPPER DIVISION COURSES

Major Courses

102B. Second-year Russian. Mr. Kaun.
Tolstoy, Anna Karenin. Practice in conversation.
2 hrs., second half-year. Tu Th, 11.

102A. Second-year Russian. Associate Professor Noyes.
Continuation of Russian 102B. Forbes, Russian Grammar.
3 hrs., first half-year. M W F, 8.

103B. Third-year Russian. Associate Professor Noyes.
Reading of modern prose and poetry.
3 hrs., second half-year. M W F, 8.

105A–105B. Russian Poetry. Mr. Kaun.
Reading of Pushkin and Griboyedov.
2 hrs., throughout the year. Tu Th, 10.

111A–111B. Second-year Serbo-Croatian. Mr. Krunich.
Reading of prose and poetry. Exercises in conversation and composition.
3 hrs., throughout the year, to be arranged.

119A–119B. Russian Composition. Mr. Kaun.
Exercises in translation from English into Russian and in original composition in Russian.
1 hr., throughout the year, to be arranged.

Free Elective Courses

The following courses do not require a knowledge of any language other than English, and are open to all students of the upper division. By special arrangement with the instructor, they may be taken as major courses in Slavic literature. In such cases the students should register in course 120 or 122.

20. The Russian Novelists. Associate Professor Noyes.
Lectures and reading. Authors: especially Tolstoy; also Pushkin, Gogol, Turgenev, Dostoyevsky, Gorky, and others.
3 hrs., first half-year. M W F, 3.

22. Slavic Literature. Associate Professor Noyes.
Lectures and reading. A brief account of the literature and folklore of Poland, Bohemia, Servia, and Bulgaria.
3 hrs., second half-year. M W F, 3.

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HONOR-COURSES IN SLAVIC LITERATURE

160. The Life and Work of Leo Tolstoy. Associate Professor NOYES.

Special assignments in connection with the work of course 20.

3 hrs., first half-year; 5 units. M W F, 3.

162. Polish Romanticism. Associate Professor NOYES.

Special assignments in connection with the work of course 22.

3 hrs., second half-year; 5 units. M W F, 3.

199A–199B. Individual Work. Associate Professor NOYES.

Candidates for honors and graduate students will be offered opportunities for independent reading and study. Credit will not exceed four units a half-year.

GRADUATE COURSES

The University library offers ample material for advanced study of Russian literature and philology, and for the comparative study of the Slavic languages.

231A. Old Church Slavic. Seminar. Associate Professor NOYES.

Leskien, Handbuch der altbulgarischen Sprache and Grammatik der altbulgarischen Sprache. Study of the relations of Old Church Slavic to the other Indo-European languages.

3 hrs., first half-year, to be arranged.

232B. Historical Russian Grammar. Seminar. Associate Professor NOYES.

Reading of Buslayev, Russkaya Hrestomatiya. Study of the development of the Russian language and of its relations to the other Slavic languages.

3 hrs., second half-year, to be arranged. Prerequisite: course 231A.

299. Individual Work. Associate Professor NOYES.

Graduate students will be offered opportunities for independent reading and study. Credit will not exceed 4 units a half-year.

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ZOOLOGY

CHARLES A. KOFOID, Ph.D., Sc.D., Professor of Zoology, and Assistant Director of the Scripps Institution for Biological Research.

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J. FRANK DANIEL, Ph.D., Associate Professor of Zoology.

JOSEPH GRINNELL, Ph.D., Associate Professor of Zoology and Director of the California Museum of Vertebrate Zoology.

JOSEPH A. LONG, Ph.D., Assistant Professor of Embryology.

WILLIAM W. CORT, Ph.D., Assistant Professor of Zoology.

ALBERT L. BARROWS, Ph.D., Instructor in Zoology.

HAROLD C. BRYANT, Ph.D., Economic Ornithologist, California Museum of Vertebrate Zoology.

ROFENA LEWIS, A.B., Research Assistant in Zoology.

CHARLES V. TAYLOR, M.A., Teaching Fellow in Zoology.

A. REMINGTON KELLOGG, M.A., Teaching Fellow in Zoology.

PIRIE DAVIDSON, M.A., Teaching Fellow in Zoology.

ERIK G. MOBERG, M.S., Teaching Fellow in Zoology.

RALPH H. SMITH, A.B., Teaching Fellow in Zoology.

JAMES B. ROGERS, M.A., Teaching Fellow in Zoology.

WILLIAM F. HAMILTON, A.B., Assistant in Zoology.

The courses are designed to meet the needs of various classes of students. For certain specific ends the following recommendations are made:

(1) Students planning to specialize in zoology should complete courses 1A and 1B as early in their course as is feasible. These courses are prerequisite to major work, and, except as noted below, to all courses in the department. The following grouping of courses is recommended: (I) 106 or 107 or 103, 103C and 108; (II) 110, 110C and 111, 111C; (III) 114 and 115; (IV) 112 and 113.

(2) For general students, courses 1A, 1B, 10, 103, 103C, 104, 107, 108, 109, 110, 110C, 111, 111C, 112, 113, 114, 115, and 20.

(3) For students planning to study medicine, courses 1A, 1B, 4, 103, 103C, 106, 107, 108, 110, 110C, 111, 111C, 114, 115.

(4) For non-biological students, courses 10, 20, 104, 114, and 115.

* On duty in Berkeley only during the last ten weeks of the second half-year.

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Students planning to enter instruction or research in zoology as a profession should not only lay a broad foundation in the courses in zoology but should also include at least the fundamental courses in chemistry and physics in their course of study. Courses in botany, physiology, palaeontology, and entomology may be included to advantage, and a reading knowledge of German and French is essential. Research in biometrics requires a knowledge of higher mathematics (Mathematics 120) and statistical methods (Economics 140).

Students who intend to do advanced work in zoology should take the Subject B examination in German, French or Latin.

Honor-students in the Upper Division.—To honor-students whose major is zoology the department offers closer supervision of their work, larger facilities in material and equipment, and wider latitude in selection of subject-matter. Its purpose is to foster initiative and independent effort. Honor-students may select a member of the staff as adviser. Guidance in a selected course of reading will be afforded. A major in Zoology should include any two of the groups of courses listed under (1) above. The remainder of the 24 major units may include any major courses in Zoology. Major courses in allied natural sciences will be accepted to the extent of not to exceed 8 units when approved by the department.

LOWER DIVISION COURSES

1A. General Zoology.

Professors KOFOID and HOLMES, Associate Professor DANIEL, Assistant Professors LONG, CORT, Dr. BARROWS, and Assistants.

An introduction to the facts and principles of animal biology, with special reference to the structure, functions, and evolution of animal life.

Lectures, 2 hrs., laboratory, 4 hrs., first half-year; 4 units. Lectures, Tu Th, 10; laboratory sections: I, M W, 8–10; II, M F, 2–4; III, Tu Th, 8–10; IV, Tu Th, 2–4; V, W, 2–4; S, 9–11 or 10–12.

The laboratory exercises are essentially illustrative of lectures and are based on the examination of living and prepared specimens, supplemented by models and charts. Professor Cort in charge.

1B. General Zoology. Associate Professor DANIEL and Assistants.

A continuation of course 1A. The behavior, structure, and development of animal types, with special reference to the lower vertebrates.

6 hrs., second half-year; 4 units. Lectures, Tu Th, 10; laboratory, three sections: I, Tu Th, 8–10; II, Tu Th, 2–4; III, W, 2–4, S, 9–11. Prerequisite: course 1A.

4. Microscopical Technique. Assistant Professor LONG.

Preparation of animal tissues for microscopical examination; use of microscope and microtome; methods of fixation, sectioning, and staining. Laboratory and reading.

3 hrs., second half-year; 1 unit. W, 8–11. Prerequisite: course 1A and elementary chemistry.

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10. General Biology. Professors KOFOID and HOLMES.

An outline of the main facts and principles of animal biology with special reference to evolution, heredity, eugenics, and the bearing of biology upon human life. Lectures with demonstrations, conferences, assigned readings, and reports.

3 hrs., second half-year. Lectures, Tu Th, 8. Conferences, four sections: I, Th, 9; II, F, 8; III, F, 9; IV, S, 9. Open without prerequisite to all students, but designed primarily for those not specializing in zoology.

UPPER DIVISION COURSES

MAJOR COURSES

103. Experimental Zoology. Associate Professor DANIEL.

An experimental study of the fundamental properties of living substance, including its development, its growth and regeneration, and an application of the transplantation of living tissues.

2 hrs., first half-year. W F, 9. Prerequisite: courses 1A and 1B.

103C. Experimental Zoology. Associate Professor DANIEL.

Laboratory experiments closely correlated with the lectures of course 103.

6 hrs., second half-year; 2 units. M W, 1–4 or 2–5. Prerequisite: course 103.

104. Animal Behavior. Professor HOLMES.

The tropisms, instincts, and intelligence of animals, and the general evolution of the animal mind.

2 hrs., first half-year. Tu Th, 4.

106. Comparative Anatomy of the Higher Vertebrates. Professor MERRIAM, Dr. BARROWS, and Assistant.

Comparative osteology (under Professor MERRIAM), dissection of a reptile, a bird, and a mammal, and lectures and recitations on the organology of vertebrates.

8 hrs., first half-year; 4 units. Lectures and recitations, Tu Th, 4. Laboratory, section I, M F, 1–4; III, Tu Th, 1–4. Prerequisite: courses 1A and 1B. Students in Zoology 106 may take the lectures of Palaeontology 104 without the laboratory work (1 unit).

107. Cytology. Assistant Professor LONG.

Structure, activities, and chemistry of the cell; cell-division, maturation of the sex cells, fertilization, parthenogenesis, and cleavage; relation of cytological phenomena to normal and abnormal growth, to differentiation, to sex, and to theories of heredity and evolution.

8 hrs., first half-year; 4 units. Lectures, Tu Th, 9; laboratory, Tu Th, 1–4. Prerequisite: course 1A.

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108. Embryology. Assistant Professor LONG.

The phenomena of animal development, fundamental facts of reproduction, comparative embryology and organogeny of the higher vertebrates. Lectures, reading, and laboratory.

8 hrs., second half-year; 4 units. Lectures, Tu Th, 9; laboratory, two sections: I, Tu Th, 8–9, 10–12; II, Tu Th, 1–4. Prerequisite: courses 1A and 1B.

*109. Biology of Water. Professor KOFOID and Dr. BARROWS.

Biological problems of the microscopic life of fresh water and of the sea from the distributional, ecological, and experimental standpoints. Laboratory, field work, and thesis.

6 hrs., second half-year; 2 units. W F, 1–4. Prerequisite: course 1A.

109C. Biological Examination of Water.
Professor KOFOID and Dr. BARROWS.

The biology of waters of reservoirs and streams, with special reference to water supply and sewage disposal. A field and laboratory course dealing with the microscopic organisms of fresh water, other than bacteria, their occurrence, distribution, and control, and their relation to problems of sanitary engineering.

3 hrs., second half-year; 1 unit. F, 1–4. Prescribed, in the third year of the sanitary course, College of Civil Engineering. Open to students of household science.

110. Protozoology. Professor KOFOID.

Structure, life-history, and ecology of the protozoa with reference to the problems of biology; the relations of protozoa to disease in man and other animals. Reports on assigned topics.

2 hrs., first half-year; M W, 8. Prerequisite: course 1A. Students in public health and veterinary science with adequate biological training will also be admitted.

110C. Protozoology Laboratory. Professor KOFOID and ——.

3 or 6 hrs., first half-year; 1 or 2 units. M F, 1–4. Prerequisite: course 1A; course 110 should be taken concurrently.

111. General Parasitology. Assistant Professor CORT.

A general biological discussion of the relations of animals to the causation and transmission of disease, with special reference to the animal parasites of man and the domesticated animals; the methods of biological prevention and control. Lectures and reports on assigned topics.

2 hrs., second half-year. M W, 8. Prerequisite: course 1A. Students of public health, and household or veterinary science who have had adequate biological training will also be admitted.

* Not to be given, 1917–18.

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111c. The Morphology and Life-history of Animal Parasites.
Assistant Professor Cort.

3 or 6 hrs., laboratory, second half-year; 1 or 2 units. M W, 1–4. Prerequisite: course 1a. Course 111 should be taken concurrently.

112. Advanced Invertebrate Zoology. Dr. Barrows.

The morphology, habitats, habits, and life-histories of the invertebrates, with special reference to local fauna, both marine and fresh-water. Lectures, readings, reports, and laboratory and field work.

7 hrs., second half-year; 3 units. Lectures, W, 9; laboratory, 6 hrs. to be arranged. Prerequisite: course 1a.

113. Advanced General Vertebrate Zoology.
Associate Professor Grinnell and Dr. Bryant.

A systematic and faunistic study of the birds, mammals, and reptiles of California, including a brief treatment of the amphibians and fishes. Lectures, field, laboratory, and museum work, with papers on assigned topics.

7 hrs., second half-year; 3 units. Th, 1–4; S, 8–12. Prerequisite: course 1a. Courses 1b and 106 are also recommended.

114. Heredity and Evolution. Professor Holmes.

A discussion of the facts of heredity; Mendel's law and its applications; the development of theories of evolution since Darwin. Lectures and reports on assigned topics.

3 hrs., first half-year. M W F, 10.

115. Eugenics. Professor Holmes.

A consideration of topics in human heredity and eugenics. Lectures, assigned reading and reports.

2 hrs., second half-year. Tu Th, 11. Prerequisite: course 114 or its equivalent.

117a–117b. Special Undergraduate Study. The Staff.

All work supplementary to courses announced above. Credit value to be fixed in each case.

118a–118b. Advanced Undergraduate Work in Special Topics.
The Staff.

Hours to be arranged.

119. Special Work. The Staff.

Work on assigned topics carried on in Berkeley when the University is not in session or in the field or at the seashore under the direction of a member of the staff. Credit, 2–6 units.

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FREE ELECTIVE COURSE

20. Some Ethical and Educational Problems Viewed Biologically. Professor RITTER.

The course consists in an effort to apply the biological conception of "organismal integrity" or the "organism as a whole," to some of the central questions with which men under modern civilization are struggling.

2 hrs., second half-year, after March 1; 1 unit. Tu Th, 4. Registration may be made with Professor KOFOID, 208 East Hall. Open to the public.

GRADUATE COURSES

221A–221B. Seminar. Development of Biological Thought in the Nineteenth Century. Professor KOFOID.

2 hrs., throughout the year; 1 unit each half-year. W, 4–6.

222A–222B. Journal Club. The STAFF.

The instructors and advanced students hold weekly meetings, at which reports are made on the research work of members of the zoological staff, and on important current papers, followed by informal discussions. Students who wish to become active members should consult Professor DANIEL.

1 hr., throughout the year; no credit. F, 4.

223. Teachers' Course. Professor HOLMES.

Aims, methods, and subject matter of zoological instruction in the schools.

1 hr., first half-year. M, 11.

240. Seminar in Protozoology. Professor KOFOID.

2 hrs., second half-year; 1 unit. Th, 4–6.

224A–224B. Research. The STAFF.

Original study on special topics, in the field, laboratory, and museum. The work may be carried on in the laboratories at Berkeley or at the San Diego station at any season of the year.

Hours to be arranged.

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